Understanding Darwin and Darwinian Understanding

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Copenhagen University Discussions in Science and Religion Vol. II

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February 20, 2013
Anne L.C. Runehov, Director

Introduction to the series

By

Niels Henrik Gregersen:

The Human Project in Science & Religion is the first volume in a new series of Copenhagen University Discussions in Science and Religion.

Copenhagen is often associated with two major figures in theology and science: *Søren Kierkegaard* (1813-1855), the forerunner of philosophical existentialism, and the physicist *Niels Bohr* (1885-1962). By happenstance this publication antedates the jubilee year of 2013, when Copenhagen University will celebrate the bicentennial of Kierkegaard's birth as well as the centennial of Niels Bohr's famous atomic model of 1913. Here, Bohr introduced the theory that electrons travel in orbits around the nucleus of the atom. While Kierkegaard spoke of leaps of faith, Bohr referred to electronic jumps between the orbits; in both cases discontinuity prevails over continuity.

Against this background, it is perhaps more than a coincidence that the Copenhagen discussions on science and religion since 2001 have taken place under the name *Forum of Existence and Science*[1]– a somewhat unusual title, perhaps, but a very apt one in a Danish context. In general, Nordic philosophers, theologians and scientists tend to be sceptical about too high a claim for a unified world-view amalgamating science and religion. Existential first-hand perspectives cannot very easily be accommodated within a scientific third-person perspective. Thus, either models of complementarity (in the wake of Niels Bohr) or models of a discipline-based dialogue are preferred over and against more extravagant claims of grand-scale metaphysical synthesis in our *Forum of Existence and Science.* We prefer to speak about interdisciplinary inquiry than about trans-disciplinary unification.

Since 2005, the Forum became part of the *Copenhagen University Network of Science and Religion* in collaboration with the *Department of Systematic Theology* and the *Centre for Naturalism and Christian Semantics*. This move was facilitated by two generous grants from the *Metanexus Institute*

[1] www.forumforeksistensogvidenskab.dk

and the *John Templeton Foundation.* We are grateful to these institutions for supporting our research as well as for giving us the opportunity to be a part of the *Global Local Societies Initiative*. We also thank Teol. Dr. Anne L.C. Runehov, who in 2008 took over the leadership of the Network. Without her commitment this series would not have been initiated.

INTRODUCTION

Anne L.C. Runehov

Charles Darwin's Origin of Species

"Descended from the apes! My dear, let us hope that it is not true, but if it is, let us pray that it will not become generally known."

These are the words with which Patricia G. Horan opens the foreword of the *Origin of Species* (1979), thereby referring to the words of the wife of the Bishop of Worcester after she heard about this book in 1859.

In1881 the Swedish philosopher Lawrence Heap Åberg (1851-1895) wrote that most people believed that Darwinism could not be harmonized with Christianity. In fact, they argued, this theory turns the history of human beings upside down. According to the Christian faith, humans are created as the masters of nature, as perfect beings, a position from which they have fallen in order to be reinstalled, not by way of their own efforts but by the grace of God. According to Darwinism, human beings work themselves upwards from the position of an animal. The human cradle is not situated in paradise; on the contrary, if there is something that might be compared to paradise in the Darwinian worldview, it is far away in the future and it is not a gift from God but the fruit of many battles and laborious fights. This way of thinking is wrong according to Heap Åberg. He was an idealist and made various efforts to combine Boströmianism (Swedish idealism) with natural sciences, not least with Darwinism. To him there is no conflict between Darwinism and Christianity because Darwinism, as is the case for all science, is only interested in human beings as beings of nature, i.e. interested in the animal part of the human being. Darwinism (in the context of human life) is about the conditions for human life to emerge. Darwinism does not explain the essence or the final causes of things. (Heap Åberg 1881 in Broberg 1991: 1087-1090). What Heap Åberg means is that scientific and religious views are complementary; the

former takes care of the material world, the latter of the mind, spirit and soul. One could say that he was quite ahead of his time in his attempt to harmonize science and religion. Needless to say, his ideas were certainly not without criticism.

One person who still believed that Darwinism had turned the world upside down was Anti Malin. In 1889, the year of Darwin's death, she wrote, "I wish I could avoid tarnishing these pages with such a hateful name [Charles Darwin]; however, since this is not possible, I want to mediate some traits from this man's life and doctrine" (Malin 1889 in Broberg 1991: 1144; my translation). Malin considered that from first wanting to become a priest, Darwin was depraved in both soul and body, due to his immoral life style on ships together with uneducated sailors. No one with a sound mind could ever believe such nonsense as "Adam and Eve" being descended from apes. This was more typical of views at the time. However, such reactions are not very surprising. Even though the theory of evolution in biology was already old at the time Darwin continued it, the overall accepted theory was clearly that God created the heavens and the earth; that Earth was about 6000 years old and that God created every species separately and more or less the way they are now. Darwin was aware of this. He actually waited 22 years after he left the Beagle before he published his work, which unleashed a storm of criticism. However, it seems that he had expected it since he writes:

> I look with confidence to the future, to young and rising naturalists, who will be able to view both with impartiality. Whoever is led to believe that species are mutable will do good service by consciously expressing his conviction; for only thus can the load of prejudice by which this subject is overwhelmed be removed (Darwin 1979: 453).

Today, 150 years later, we still find ourselves in a similar position. On the one hand, there are scientists, scholars and theologians (and laymen for that matter) who do not see a problem with harmonizing Darwinism

with religious faith while on the other hand, there are those still fighting for the separation between scientific and religious theories. More so, some still claim Darwinism (or the theory of evolution) to be entirely corrupt. As Horan writes, "Even now, Darwin remains the *Bête noire* of fundamentalist Christians […]" (Horan 1979: ix). Let me end this introduction with the last sentences of the *Origin of Species:*

> There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved (Darwin 1979: 439-440).

The present collection of essays results from several lectures organized by the *Copenhagen University Network for Science and Religion* during 2009, in honour of Charles Darwin's publication of the *Origin of Species* 150 years earlier. This event was celebrated all over the world.

Presentation of the Chapters

Chapter one

The term "metaphysics" has its origin in the Greek words *μετά* (meta, meaning beyond, upon or after) and *φυσικά* (physics). Later metaphysics became a philosophy concerned with explaining the nature of being and the world. The aim is to clarify the existence of the world and being in terms of its properties, cause and effect, time and space, probabilities and possibilities. This is done by investigating the basic categories of being and the world and how they relate to one another. A metaphysical system is hence a system of life through which all aspects and processes of life can be understood. It is as such, Momme von Sydow understands the

term and suggest that "Darwinian metaphysics" might be a suitable term for al historic or recent approaches claiming that Darwinian processes essentially offer a universal account of biology, culture and our very being. Von Sydow distinguishes between Darwinism and Evolutionary theory, between broad and narrow Darwinian metaphysics and between gene-Darwinism and universal process Darwinism. After having clarified these distinctions he raises the question "Are Darwinian theories metaphysical systems?" And ends his chapter with providing two theoretical reasons for assuming a Darwinian metaphysics. The first reason, he argues would be the problem of induction and the second the survival of the fittest.

Chapter two

In "The impact of Darwinism on Christian Theology, Christopher Southgate takes Darwinism to be Darwin's own basic schema of descent with modification on the one hand and the combination of that scheme with genetics, molecular biology and the insights of developmental systems theory and self-organisation on the other hand. He considers five areas of Darwinism taken to be a challenge for Christian thought. The aim is to clarify if and to what extent these areas of Darwinism actually are a threat for Christian doctrines. The first one concerns the theory of evolution itself challenging the creation according to Genesis 1. The second challenge is related to the first, namely, gradually evolution vs. Divine design. The third challenge derives from Darwin's *The Descent of Man* where he argues that the human species evolved from other from other species and hence challenge the Christian thought of the uniqueness of the human species. The forth challenge to Christian though is argued to be sociobiology, i.e. religion exists because it had its evolutionary purpose and that would explain its existence and its long persistence in the human psyche. The last one he calls the greatest challenge. This challenge has been discussed for centuries and is best known as the theodicy problem: why has there been and still is so much suffering of creators? Obviously all five areas of Darwinism are related to another in their challenge to Christian thought and the conclusion cannot be other that Darwinism is neither the disguised friend nor the enemy.

Chapter three

In his response to Southgate's reasoning, Andrew Robinson draws on René Girard's theory of atonement, especially regarding the concepts of sacrifice and victimhood in order to show how this theory fits into his own work on semiotics and Trinitarian theology. According to Robinson, the semiotic processes in the world – processes of representation, meaning, and interpretation – correspond to the threefold being of God. In other words, the Son, or Word is different from the Father but is able to represent Him. The Spirit interprets the Word of the Father and makes the Word lively and intelligible by virtue of her role of mediation. The triadic patterns of semiosis in the world are "vestiges of the Trinity in creation". Inspired by C.S. Pierce's taxonomy of signs, Jesus is seen as a qualisign of the being of God, i.e. the embodiment of the exact quality of God's being. This sign is, in turn, embodied by virtue of the fabric of human life. Thereafter, he shows how the approach of combining the theory of atonement together with the semiotic model of the Trinity, might tie in with Southgate's approach to the tasks to which humans may be called in the fulfilment of God's creative purposes. One of the important elements in such an approach is the recognition that when God-ness becomes embodied within the created order, it becomes so as failure and as victim. All of creation is in "the same boat" facing inevitable extinction. However, humans are able to recognize, interpret and respond to the sign of quality of God's presence in the world and can therefore collectively embody that same quality. If that happens, creation would become free from its bondage and decay, from fear of death.

Chapter four

In Creativity through Emergence, a Vision of Nature and God, Antje Jackelén asks the question whether emergence can focus on dynamics and potentiality in such a way that the notion of levels is both validated and relativized. The answer is yes. However several steps are to be taken, firstly, the dualistic understanding of nature versus culture has to be abandoned. Secondly, design and order need to be revisited. Another way of talking about creation than in terms of design and order is presented. God can be seen as the "infinitely liberating source of new possibilities and new life" or as "serendipitous creativity" or as "the networker". Furthermore, chaos is preferred over order, messiness over clarity. Even

though such views are not without problems, they are in consonance with scientific views of emergence and self-organization. In the next section on creation and emergence, Jackelén presents five critical issues to the theories of complexity and emergence and asks for the theological relevance of emergence. She argues for keeping the doctrine of creation ex nihilo but without its metaphysical restriction to the dualism of form and matter. By doing so, creation ex nihilo opens the doors for a theological understanding of processes of emergence. The last section presents six elements of her vision in light of emergence. In the light of emergence how can we talk about (1) nature; (2) human nature; (3) God; (4) natural evil; (5) sacramentality; and furthermore, (6) what bearing does a heuristic understanding of emergence have on theological method in general?

Chapter five

How should Christian Theology be understood? Is the question posed by Lluis Oviedo in Theology after Darwin and Beyond. Should we take the indifference stance towards scientific development, especially perhaps the theory of evolution, or should we study the relevance of this theory for Christian theology? And if so, to what extent can this theory be integrated into traditional Christian understanding of the world? What impact does Darwinism have on Christian understanding of human life and the world? Oviedo shows that adapting Darwinian thought to Christian theology has advantages as well as risks. One challenge is that the theory of natural selection might render God's role as creator, maintainer and improver of the natural realm redundant. Another important theological doctrine that is challenged is the one stating that human beings are created in the image of God of love. However, he argues, that there are risks to take is not solely the case for theology but also counts for philosophy and ethics. For example, the theory of evolution might imply nihilism. On the side of the advantages, Oviedo put the meaningfulness of process of evolution when the divine is introduced into the process. This line of thinking adds purpose and hope to the open and dynamic process of evolution rather than seeing it as a random process. Another advantage is that the theory brings with it a better strategy to deal with the theodicy problem and the doctrine of original sin. While conflicts may be unavoidable, meeting the challenges

can result in opportunities, when properly understood. Indeed, current biological developments theology is called to integrate a more dynamic view of reality, conscious pragmatism and a consequent level of realism. Finally, moving beyond Darwin's original theory, Oviedo proposes to take into account the recent developments in Christian anthropology.

Chapter six

Eberhard Herrmann takes us deeper into the argument of the relevance of pragmatism for the science-religion debate. He sees intolerance as a consequence of dogmatic truth claims that more often than not indirectly builds upon the philosophical standpoint called metaphysical realism. His aim is hence to try to show that this standpoint is philosophically untenable, that its comprehension of truth is particularly problematic, and that there is an alternative line of thinking which, inspired by Hilary Putnam is called pragmatic realism. The aim is also to try to show that pragmatic realism does not lead to intolerance and might be a more prosperous way of discussing the relationship between science and religion. In part one; he explains metaphysical realism and its implications for the science and religion debate. How then could such different views of reality, apprehended as entirely real, ever meet? In part two the concept of truth is tackled. Are truth and fact synonymous - "p" is true if and only if "p": the sky is blue, if and only if the sky is factually blue. In order to tackle this philosophical problem, Hermann makes an important distinction between "concepts" and "conceptions". This is a distinction which shows to be very useful not least when it comes to religious truth claims. After all, as social, biological beings, when we talk about reality, it is with necessity the reality that is given to us. Hence, if we want to talk about truth, we need to know how we distinguish between true and false in our different kinds of praxis. According to Hermann, this does, however, not lead to relativism because, regardless of whether it concerns scientific or existential praxis, humans share well-tried (observational) experiences. Realizing that we reason from within our social-biological realm we realize that also other people do so. Realizing this, we are ready to advocate freedom of science and freedom of views of life, but also freedom from scientific and religious fundamentalism.

Chapter seven

Responding to Eberhard Hermann's pragmatic realism, Kees van Kooten Niekerk responds in a critical realist manner. It seems that metaphysical realism can be understood in different ways. Whilst Hermann's understanding of metaphysical realism is equal to how Hilary Putnam understands it, i.e. an understanding that includes both an ontological and epistemological doctrine, van Kooten Niekerk's understanding is more limited and only contains the ontological doctrine. Nevertheless, in van Kooten Niekerk's view, Hermann must have presupposed metaphysical realism in this limited way also, because, he asks, how else could a reality exercise resistance and make us change our conceptualizations? So why cannot Hermann except critical realism? The reason, it seems lies again in how critical realism is understood. Even if critical realism implies metaphysical realism it does not imply naïve realism, which claims that external reality is "exactly" as we perceive it. Critical realism maintains that the knowledge we get is with necessity always "human knowledge", i.e. it always dependents on the biological and mental human system. Where do Hermann and van Kooten Niekerk meet and where do they depart from each other's view? With some minor differences, there are three points of agreement: (1) Aristotelian definition of truth; (2) language being the mediator of reality and hence that reality always is conceptualized reality (for us); (3) the relationship between reality's resistance and our preconceived ideas. They depart however in the significance they attribute to the phenomenon of reality's resistance. In van Kooten Niekerk's view, reality's resistance not only shows that there is an independent reality (how else could it exercise resistance) but also tells us something about what reality is like.

Chapter eight

A different approach to Darwinism derives from Lars Sandbeck who describes one of the consequences it had in Denmark, namely, the emergence of a new atheism. Even if the new atheism (one of the perhaps most famous advocates being Richard Dawkins) is a movement, consisting of different atheist societies, consisting again of individuals deriving from different backgrounds and aspirations, there are several commonalities between these groups. The similarities are pointed out by

analysing four articles (two negative and two positive), (1) Intolerance of ignorance, myth and superstition; (2) disregard for the tolerance of religion; (3) indoctrination of logic and reason; (4) advancement of a naturalistic worldview. In the Scandinavian countries, atheism and secularism has been victorious to a degree that of reducing Christianity to a symbolic and cultural heritage. Hence, one would expect that there is no great marked for promoting atheism anymore. However, such is not the case. Rather, the case is that the new atheists strive to remove religion from the public realm all together; its symbols, practices, etc. should be kept within the private realm only. This suggests that the public Danish society should be atheist or anti-religious. What is interesting is that the new atheism is not free from rituals and ceremonies (which actually are very similar to religious rituals and ceremonies). There seem to be a need to highlight special occasions in life (birth, marriage, communion, etc…) as well. How does this relate to "free and rational thinking"? There seem to be a need to celebrate certain life events as something larger and more meaningful. Can this be interpreted as fetish religiosity?

Chapter nine

The present article continues on the subject matter of atheism and deals with three arguments in contemporary new atheism: (1) It is false that God created life and humans; (2) it is also false that human beings are anything more than matter and (3) it is false that there is anything beyond matter. These assumptions are, according to Carl-Reinhold Bråkenhielm based on arguments coming from the natural sciences: (1) the theory of evolution implying that there is no need for a supernatural explanation of the world; (2) neuroscience has proven that there is nothing over and above neural activity and (3) physicists have shown that matter is the ultimate stuff of reality. One of the basic tenets of neoatheism is that Christian belief is incompatible with evolution. According to Bråkenhielm, one of the main reasons for this divorce is that Christian belief is equalised with creationism. But there are alternative interpretations, for example, Deism and what Bråkenhielm calls transnaturalism. However, one price to pay for Deists is that God does not intervene at all. God is passive. The transnaturalist on the other hand can claim that God is a "hidden variable" in, for example, the evolutionary development. Hence, whether Christian belief is compatible

with evolution or not depends on how one understands the Christian faith. The next question is whether all mental activity is merely neural activity? The answer is no. Neurological data is consistent with the theory of emergence, however, how mental processes emerge from neurological processes is still not understood. Finally, Bråkenhielm critically analyses scientific materialism, maintaining that the eschatology doctrine is unintelligible as a scientific hypotheses (it conflicts with the Epicurean hypothesis).

Chapter ten

In this chapter Ted Peters launches a new field of inquiry and reflection, namely, Astrotheology. Astrotheologians are interested in the discoveries within astronomy, cosmology, astrobiology, exobiology, astroethics, and ExtraTerrestrial Intelligence research (ETI). In order to understand the research attentions of astrotheologians, the first section explains astrobiology and its related space sciences, their subjects of research and methods. For the same purpose, pre-Copernican and post-Copernican versions of astrotheology are presented and explained in the second and third sections. Hereafter, Peters draws our attention to four essential questions concerning (1) the scope of God's creation; (2) the possible amount of incarnation; (3) whether theology should criticise science and (4) whether we should prepare for contact. The Christian faith has been criticised for being geocentric and anthropocentric, anachronistic and out of date. According to Peters it is time to critically examine these ancient worldviews and values (especially the value attributed to intellectual capacity, intelligence and reason) and the assumptions involved. Hence, one task for the astrotheologians is to clarify and correct the regnant opinion on the matter of geocentrism by, for example, enlarging the scope of the concept of creation. The second item of investigation concerns single or multiple incarnation. Peter's directive to astrotheologians is here that they should set the parameters for debating Christology and soteriology, because that some endorse multiple incarnations while others do not depends on how one thinks of soteriology as revelation or atonement. The answer to the question whether theology should criticise science is that scientific claims should be critically analysed on their presuppositions and assumption of theological issues as well as of the scientific enterprise in question. Are

the studies scientific or are they (or involve) scienticistic (arguments)? Are the studies methodological or ontological reductionist? Is there a hidden agenda? The last question of whether we should be prepared for contact is also answered by yes. One reason is that science is often seen as progressive and successful, religion is pictured as old-fashioned and obstructive. Be this the case or not, whether a day of contact comes or not, prospects of ET contact should prompt in the theologian a sense of responsibility.

Chapter eleven

Robert John Russell deepens the investigating of scientists' search for ETI further by looking at the philosophical and theological implications. This is done in the first part of the article. In the second part, he investigated the philosophical and theological assumptions and presuppositions which lie within, and in some ways shape, the ongoing scientific research for intelligent life in the universe. The method he uses he calls Creative Mutual Interation (CMI), which implies that a critical philosophical analysis of the implications of science on theology is performed. Thereafter, new questions for scientific research based on theological insights are suggested. Since there is no clear answer to the question whether life in the universe is rare or abundant, we can only theoretically estimate a relative abundance of life in the universe. Even if such theoretical enterprises are controversial, they seem to stimulate scientists to search for ETI. However, it seems that these scientific enterprises are based on philosophical presuppositions. Russell discusses and critically investigates four of them: (1) ETI exists in relative abundance; (2) ETI can be recognized by their signal; (3) ETI wants to be discovered and (4) ETI is more likely benign than malevolent. In turn, these philosophical presuppositions are based on theological assumptions. (1´) God created the laws and constants of nature throughout the universe so that self-conscious creatures could evolve. (2´) This philosophical presupposition is based on at least the following theological assumptions. (a) The sign of the logos tradition; (b) creation in the imago dei. (3´) All life in the universe has been created by the God who is Trinity, a God who is intrinsically relational. (4´) Dei caritas est. Hence, similarly to Ted Peters, Russell invites us to be critical towards

scientific claims when these claims concern subject matters which are not specifically scientific.

The mystery of the beginning of all things is insoluble by us; and I for one must be content to remain an agnostic.

Charles Darwin

Darwinian Metaphysics

Momme von Sydow

Introduction

'Darwinian metaphysics' may be seen as a compound of two antonyms, since Darwinism has often been treated as a scientific theory opposing religious and philosophical kinds of metaphysics. Correspondingly, the use of such a term may appear provocative, almost as if one were using 'Darwinian religion' to designate a general Darwinian approach. The approach and the term itself, therefore, are bound to elicit criticism from positivistic as well as metaphysical positions. Nevertheless, 'Darwinian metaphysics' appears to be a suitable term for all historic or recent approaches claiming that Darwinian processes essentially offer a universal account of biology, culture and our very being. Although Charles Darwin did indeed mainly concentrate on biology, he speculated that his theory would at least "give zest […] to whole metaphysics" (Notebook B, p. 228). Before we discuss Darwinian metaphysics in the narrow sense, based on a radicalization of Darwinism, we will briefly discuss the proposition that in fact several quite different approaches may be interpreted as Darwinian metaphysics.

Darwinian metaphysics in a *broad sense* is difficult to characterize, since throughout intellectual history 'Darwinism' has been presented in different forms and has been used to build syntheses with many other ideas. For instance, Darwinism, even if defined as a biological theory of natural selection, has had an influence on quite different kinds of social Darwinism, from *laissez-faire* capitalism to racism to anarchism. Likewise, historians have linked Darwinism to many philosophical systems—for instance, to that of Herbert Spencer, Ernst Haeckel, William James, and Charles Sanders Peirce. Furthermore, although

Darwinism sometimes seems to be linked to progress (at least in the sense of adaptation), Darwinism allows for *local* adaptation only and hence is generally considered to preclude the possibility of genuine progress (see, e.g., Gould 2002)—not least because the process underlying evolution is interpreted to remain essentially static (see, e.g., von Sydow 2012). Darwinism, with the central concept of struggle for life, particularly among conspecifics, appears to emphasize conflict over co-operation. Moreover, Darwinism at least probabilistically seems to have been correlated with materialism and atheism. Yet one should also note that from the very formulation of Darwinism there have been attempts to interpret natural selection in the opposite direction, linking natural selection to God's invisible hand. Historically, the relationship between science and religion has been more volatile and intricate than the actual conflict today between a radicalized Darwinism and a radicalized religious fundamentalism would suggest. Darwin himself not only studied theology at the University of Cambridge, but he seems in fact to have aimed at retaining some aspects of William Paley's natural theology in his elaboration of the theory of natural selection (even though the theory did indeed later contribute both to Darwin's own increasing agnosticism and a quick decline in the estimation of Paleyian natural theology; see von Sydow 2005).

Darwinism and evolutionary theory

It is important to distinguish Darwinism from evolutionary theory as such (evolution was advocated in different schools in France and Germany before the publication of *The Origin of Species*). Furthermore, some philosophers (such as Teilhard de Chardin, Henri Bergson, and Alfred North Whitehead) made interesting proposals for a 'metaphysics of evolution' that must be seen in contrast to any 'Darwinian metaphysics'. On the whole, the relevance of biological Darwinism to ethical or religious issues is highly controversial. There was reaction against the influence of Darwin in the fields of philosophy as well as theology, as well as objection on the part of several authors to the asserted direct relevance of biological theories to ethics (e.g., G. E. Moore) or revealed

religion (e.g., K. Barth). Whether one can postulate an epistemic autonomy of these disciplines, however, seems to depend on one's pre-existing logical, epistemic, ontological positions, and also on the details of one's biological account. Correspondingly, different sub-paradigms of Darwinism displayed different views on the autonomy of culture or ethics. Theories that can been characterized (at least partly) as Darwinian, such as Darwin's first formulation of Darwinism; Weismann's Neo-Darwinism; the early evolutionary synthesis; the late evolutionary synthesis; gene-Darwinian socio-biology; and multi-level-Darwinism, held different positions with respect to reductionism and the autonomy of sociology and ethics (see, e.g., von Sydow 2012). Overall, the heterogeneity of thought on Darwinian metaphysics has two main causes; first, the variation of underlying biological theories and reductionist leanings throughout history; and second, the fact that 'auxiliary hypotheses' needed to link Darwinism to metaphysics sprang from various traditions and were relevant in the elaboration of metaphysical systems.

Darwinian metaphysics in a more *narrow sense* is based on a "purer" Darwinism and (less pluralistic) understanding of the theory. K. R. Popper, D. Campbell, R. Dawkins, D. C. Dennett and (arguably) D. Hull may be cited as main proponents of this Darwinian metaphysics—of which two types need to be distinguished: gene-Darwinism and (universal) process-Darwinism.

Two types of Darwinism

Gene-Darwinism

The first type, *gene-Darwinism*, is a radical interpretation of Darwinism that became popular in the 1970s. Its basic ideas have been popularized, particularly by R. Dawkins and G. C. Williams. Pure gene-Darwinism reduces living entities and processes in the biological and social worlds to single selfish genes in Darwinian processes struggling for survival (for a critical survey, see von Sydow 2012). Phenotypes as well as products of organisms, such as beavers' dams or human habitation structures (so-called 'extended phenotypes') are interpreted as mere ephemeral vehicles

of potentially immortal selfish genes (Hull and colleagues deviates on the issue of vehicles and sees them as interactors, Hull, et al., 2001). In the words of R. Dawkins, just as "Chicago gangsters, our genes have survived, in some cases for millions of years, in a highly competitive world. This entitles us to expect certain qualities in our genes. I shall argue that a predominant quality to be expected in a successful gene is ruthless selfishness. This gene selfishness will usually give rise to selfishness in individual behaviour." (*The Selfish Gene*, 1976, p. 2; cf. Dawkins 1983).

One reason to regard gene-Darwinism as a purification or radicalization of Darwinism is that one defining aspect of traditional Darwinism (at least Darwin's Darwinism) is a reductionist stance in the units of selection debate by a primary focus on individuals (which, according to Gould 2002, is one of three defining aspects of Darwinism). The focus on selfish genes (gene-reductionism) thus radicalizes the reductive tendency inherent in traditional Darwinism as well.

Moreover, just as Darwin's Darwinism has been contrasted to earlier romantic accounts which stressed the evolution and "unfolding" of nature and the role of form and structure, gene-Darwinism in a second sense radicalizes Darwinism in this respect as well, by degrading phenotypes to puppets or mere vehicles of genes (germ-line reductionism).

Finally, whereas paradigms that were perceived as Darwinian (such as Darwin's Darwinism and the evolutionary synthesis in its later phase) remained to advocate a limited process-pluralism, gene-Darwinism reduces all evolutionary processes to the only truly Darwinian natural selection (process reductionism). For example, sexual selection from the perspective of single genes cannot be seen as a mechanism in its own right (referring to auto-selection); rather, the process becomes identical to natural selection (both equally referring to hetero-selection). It may even be argued that the entity 'gene'—or, more abstractly, the entity of an atomic 'replicator' (see Dawkins 1983)—directly corresponds to or is equivalent to a Darwinian process of replication, blind variation and external selection (von Sydow 2012).

However that may be, according to gene-Darwinism there is essentially only one entity— the selfish gene— and only one evolutionary process—a Darwinian process. God, according to universal

Darwinism is at best a blind watchmaker. The question of whether Dawkins' and Dennett's prominent critiques of religious thought are directly linked to this position may remain open (*The God Delusion*, 2006; *Breaking the Spell*, 2006). Nevertheless, if one advocates a pure gene-Darwinian position and takes up the sociobiological battle cry to 'biologise' social sciences and ethics (E. O. Wilson), one ought not to be surprised when several gene-Darwinian authors (despite R. Dawkins' more cautious position on ethics) consider maximisation of gene-replication as the only ultimate biological categorical 'imperative'.

Process-Darwinism

The second type of Darwinian metaphysics is *process-Darwinism*, with roots going back to A. Weismann and C. S. Peirce. Whereas at first Weismann advocated the omnipotence ('Allmacht') of the one basic process of natural selection, he later postulated several levels of what are now referred to as Darwinian processes. During the course of the twentieth century the main contributions to process-Darwinism were made by R. Campbell, D. C. Dennett, D. Hull, H. C. Plotkin, K. R. Popper, and R. Dawkins. Process-Darwinism need not be committed to gene-reductionism; and yet it remains a defining characteristic of Darwinian process reductionism.

Whereas gene-Darwinism allows for natural selection on the single level of selfish genes alone, process-Darwinism claims that these processes exist on several levels, and in fact constitute the only remaining processes of adaptation. D. Campbell (1960), in an early main contribution, advocated that Darwinian processes were the only processes of "knowledge acquisition". Darwinian processes represented the algorithmic structure of natural selection (in a broad sense) as defined by the two-step-process of blind-variation-and-selective-retention (Campbell 1960). The last of the two sub-processes may likewise be called 'external selection' or 'environmental selection', since it generalizes natural selection (in the narrow sense). Finally, Darwinian processes are normally assumed to lead to a gradual evolution.

What are the main fields in which a process-Darwinian account has been explored? Even within biology, the revived multi-level approach in evolutionary biology, criticizing pure gene-Darwinism (Gould 2002; Wilson & Wilson 2007), assumes (at least in some of its proposals) full

Darwinian processes (for instance, on the level of species; cf. the work of M. T. Ghinselin and D. Hull). However this may be, the term "process-Darwinism" is usually only used in accounts where Darwinian processes have been advocated outside of evolutionary biology as well. Proposals have been discussed in a number of areas, from immunology, neurology, and language-development to the three main areas of philosophy of science, psychology of trial-and-error learning and creativity, and economics (see Table 1 for an overview).

Table 1. Process-Darwinism and specific Darwinian processes in selected disciplines

Discipline	**Object of Evolution**	**Darwinian Processes**	**Authors**
Biology	Genes	Blind mutation and natural selection	G. C. Williams, R. Dawkins
Psychology	Operants, acts, associations	Trial and error	B. F. Skinner, D. T. Campbell
Philosophy of Science	Theories	Conjectures and refutations	K. R. Popper, S. Tolmin
Economics	Firms, products, routines	Innovation and market selection	M. Friedman

First, falsificationism, founded by Sir K. R. Popper, had a strong impact in the philosophy of science, but was first advocated without explicitly linking it to Darwinism. Popper's original position is usually introduced based on asymmetry between verification /confirmation and falsification—a theory can never be fully verified by instances but may

be falsified by a single one. On this basis Popper opposed any form of inductive confirmation and argued that scientific theories can be falsified only. Yet in his book, *Objective Knowledge – an Evolutionary Approach* (1972), Popper in fact closely linked his postulated theory of conjecture-and-refutations to Darwinian evolution. Correspondingly, for Popper, the development of ideas was irrational and analogous to chance mutation. Likewise, R. Dawkins (1976; cf. 1983) advocated that ideas evolved by a Darwinian process. He coined the term 'meme' as analogous to 'gene' for atomic replicating and mutating elements of thought that are the units of selection. Whereas Dawkins assumed a radically reductionist stance within biology, for the meme-level he appeared to advocate a degree of autonomy. Although the consistency of his position has been criticized, it nevertheless represents an interesting attempt at reviving the idea of a cultural level; here by replacing with Darwinian processes such traditional notions as 'logos', 'spirit' or 'Geist'.

Second, trial-and-error learning (or 'operant conditioning') in psychology has been central to the behaviourist concept of learning. Although one may interpret the rigid research program of behaviourism partly as a bulwark against biologism, paradoxically B. Skinner actually postulated that he was introducing a Darwinian process at a second level. Furthermore, at a later date the analogy of trial-and-error learning with mutation and selection (or, more correctly, with blind-variation-and-selective-retention) was emphasized (Campbell 1960; Hull, et al. 2001). Likewise, psychological creativity has been interpreted as a Darwinian process (by D. Campbell and D. K. Simonton; cf. Campbell 1960 and Gabora 2005).

Finally, analogies between neo-classical economics and neo-Darwinian biology have been discussed. Some have treated Popper's philosophy as founding a philosophy of radical capitalism (although in *The Open Society* he actually allowed for some degree of state intervention). Similarly, the work of M. Friedman, who backed the neo-liberal policies of the last decades of the previous century, was inspired by Darwinian ideas. Moreover, several proposals in economics have been made that directly refer to the concept of universal Darwinism, where companies or routines have been interpreted as evolving by Darwinian processes, with innovations corresponding to mutations and given

consumer preferences to the natural selection by the invisible hand of the market (confer, e.g., Hodgson 2002).

With respect to these Darwinian processes, it is debatable whether their postulated combination (in a process-Darwinian account) in fact yields implications that are quite non-Darwinian (e.g., non-blind variation at some level); also whether this leads to inconsistencies, thus transcending strict process-Darwinism (von Sydow 2012). Likewise, although process-Darwinism normally continues to stress competition (the struggle for life) over co-operation (particularly in its application to economics), it should be noted that process-Darwinism allows for the argument that our thoughts, ideas, and theories die instead of us (P. Munz), mitigating a nature red in tooth and claw. Finally, although advocates of process-Darwinism usually subscribe to a naturalistic research program, the emphasis on the algorithmic level of natural selection (cf. works of D. C. Dennett or P. Munch) may be interpreted to go beyond this commitment, basing the theory on a mathematical structure, a form or a principle, rather than on matter or observations.

Are Darwinian theories metaphysical systems?

Let us return, however, to the question of whether it is appropriate to treat these Darwinian theories as metaphysical systems. Depending on one's understanding of metaphysics, such labeling may either be too high an honour for these sometimes philosophically naïve Darwinian theories— metaphysics traditionally being the highest discipline of philosophy—or else it is too severe a discredit to them to be assigned to a philosophical discipline that concerns itself with "meaningless" questions. Many authors today, however, use the term 'metaphysics' in a more liberal way, neither necessarily referring to an all-embracing philosophical system set up a priori by a single author, nor accusing metaphysics of being a vacuous system of tautological claims. The term 'metaphysics' is not restricted to continental philosophy, but rather has also come into use in what may still be broadly called "analytical philosophy" . Yet what would the response be if one were to argue that these Darwinian theories were the result of plain empirical induction involving no metaphysics?

First, historically, Darwin's great synthesis was clearly not only a great *empirical* synthesis, but a *theoretical* one as well, formulated while ordering the evidence gathered during his journey with the HMS Beagle in the light of available theories of his day (being strongly influenced for instance by Malthus, Paley, Lyell, Grant, etc.). Interestingly, these influences extended to theological approaches (Rev. Malthus and Rev. Paley). Darwin himself acknowledged the influence of William Paley's natural theology, and conceded that everyone with such metaphysical preconceptions would have exaggerated the belief in adaptation and "naturally extend[ed] too far the action of natural selection […]" (Darwin, *Descent of Man,* 1877; cf. von Sydow 2005, p. 154). This is the case, although Darwin's theory of natural selection seems to have dealt a death blow to natural theology as well as to Darwin's own belief. However, Darwin's Darwinism in its initial formulation was even by Darwin's own claims not based on 'plain empirical induction' but rather was influenced by theoretical and even theological considerations. Even were this not so, one could still question a presupposed rationalist understanding of metaphysics. Notably one also hears the term 'empirical metaphysics' today.

Second, gene-Darwinism and process-Darwinism are not generally advocated in the context of a single specific discipline, but rather are universally advocated for all living entities. Attempts have been made to apply gene-Darwinism in order to "biologise" sociology and ethics. Process-Darwinism has developed in biology, psychology, the history of ideas, and economics. Hence the term "universal Darwinism", introduced by Dawkins (1983), seems appropriate. If generality of the intended field of application is taken as a criterion for a theory's being termed a metaphysical approach, and if another criterion is the abstractness and simplicity of the basic explanatory concepts (for both types of Darwinian metaphysics: Darwinian processes), then we are clearly concerned with metaphysical systems.

Finally, and most importantly, the claimed generality of Darwinian processes is to be classified as a metaphysical approach even if one adopts a rationalist understanding of metaphysics based on self-evident principles or *a priori* truth. In fact, major authors of Darwinian metaphysics (Popper, Campbell, Dawkins, and Dennett) present their approach based on principles or theoretical arguments, which in a way

constitutes a 'fundamentalist' position. Paradoxically, Darwinian metaphysics, often depicted as empirical generalization or a positivist "success story," actually seems to revive the rationalist project of an ultimate theoretical justification of a metaphysical position based on first principles. It may suffice here simply to mention Popper and Dawkins. Popper did not argue inductively in favour of a high generality of Darwinian processes, but instead advocated their universality in principle. His argument is in fact based on logical considerations--the above-mentioned logical asymmetry of falsification and verification--and is linked to the fundamental problem of induction that is attributed to the philosopher David Hume (see below). It is only on this basis that he could argue in such a general way that the "growth of our knowledge is the result of a process closely resembling what Darwin called 'natural selection'; that is, the natural selection of hypotheses: our knowledge consists, at every moment, of those surviving so far in their struggle for existence; a competitive struggle which eliminates those hypotheses which are unfit. [...] The theory of knowledge which I wish to propose is a largely Darwinian theory of the growth of knowledge. From the amoeba to Einstein, the growth of knowledge is always the same […]." (Popper 1972, p. 261). Dawkins also seems to be committed to a rationalist foundation of universal Darwinism, making it a truly metaphysical account (1983). He claimed that Darwinism is not only empirically, but also theoretically "probably the only theory that *can* adequately account for phenomena that we associate with life" [italics added]. Other explanations were "in principle incapable of [...] explaining the evolution of organized, adaptive complexity" (pp. 403, 404). Dawkins has argued against any form of instructivism: "Even if acquired characters are inherited on some planet, evolution there will still rely on a Darwinian guide for its adaptive direction" (p. 409).

Reasons to assume a Darwinian metaphysics

In this last section, two theoretical reasons will briefly be considered for assuming a Darwinian metaphysics.

The problem of induction

First, a main 'metaphysical' argument favouring Darwinian metaphysics is linked to the fundamental problem of induction often attributed to David Hume in the eighteenth century. This problem may have had an even longer history; for in scholastic philosophy, first formulations of the problem were paradoxically used to support religious or rationalist positions against empirical ones. Hume, however, with the goal of justifying empirical induction, showed that one cannot "prove that those instances, of which we have had no experience, resemble those, of which we have had experience" (*A Treatise of Human Nature*, 1739/1740, Book I, Part III, sec. VI). Nature may change its course and our inductions be rendered false. This in fact implies that all our knowledge, including such a simple and apparently well supported claim as "the sun will rise tomorrow", may be fallacious. Popper concluded that no confirmation of a theory will ever make a theory 'truer' or more 'probable' than a less supported alternative (provided the alternative has not already been falsified). Accordingly, there are no true or probable theories—only theories that have or have not been falsified. Such a 'negative solution' to the problem of induction in Popper's logic of discovery asserts that scientists in fact make blind conjectures and that they should rather aim solely at refutations (falsifications). This, moreover, supports a universal justification for Darwinian processes of blind conjectures and environmental refutations.

The fundamental problem of induction is a highly intricate and hotly disputed issue in philosophy and cannot be treated in any further detail here. Yet it must be noted that Popper's position is highly controversial in philosophy of science (starting with early criticism by W. V. O. Quine, H. Putnam and I. Lakatos). Several authors, for instance, have argued that the postulated asymmetry of confirmation and disconfirmation does not hold with regard to complex or compound theories (where it is not clear which aspect of a theory is to be falsified; nor with respect to probabilistic relationships (as they cannot be falsified by single disconfirmations). Moreover, one may object to the link between the problem of induction and falsificationism: Although plain falsification of a formerly "valid" rule deductively proves that the rule does not hold overall, a falsification applied to the past rule does not logically prove that the rule may not hold in the future. If one assumes

that prediction is essential to organisms as well as to scientists, the problem of induction seems to apply equally to falsifications. Although the problem of induction remains fundamental, it may therefore be argued that this problem does not necessarily favour a falsificationist approach over a confirmatory one. Furthermore, in recent years there has been a revival of Bayesian approaches, both in philosophy of science (e.g., C. Howson and P. Urbach) and in psychology (e.g., M. Oaksford and N. Chater); that is, it is argued that people, when testing logical hypotheses, search for data in a rational, informed, and more active way than would follow on the basis of Darwinian processes alone.

Survival of the fittest

The second way Darwinian metaphysics may have gained plausibility (at least in popular writings) may be linked to the ambiguous meaning of the phrase 'survival of the fittest'. Darwin borrowed this expression from H. Spencer in 1869 as a synonym for 'natural selection'. Yet, although it appears on the surface to be both testable and plausible, it may also be interpreted as a tautology: that is, if fitness is interpreted in terms of survival, this results in the phrase of the 'survival of the survivor'. More refined definitions are of course possible and have been proposed. For instance, "fitness" is often defined in terms of reproduction; but this does not in fact resolve the problem, since one would then be obliged to measure the term 'survival' in terms of reproduction as well (in order to avoid a formulation that is plainly false). Similarly, one may consider a probabilistic formulation of fitness. Once again one would need to look at both sides of the phrase which once again would produce a truism: "those organisms probably survive which probably survive". The possible problems arising from these "improved" reformulations may in fact question whether "survival of the fittest" is always being used in a testable way. It is of course beyond reasonable doubt that evolution and Darwinian evolutionary theory provide a plethora of testable and very well tested theories. Nonetheless, it seems plausible that at times it is only more specific theories that are tested, leaving the 'survival of the fittest' as an explanatory framework rather than as a testable theory. Moreover, it is not claimed that "survival of the fittest" is always and necessarily used in a tautological way. Actually there seem to be falsifiable ways to define "survival of the fittest" (von Sydow 2006).

Nevertheless, the tautological meaning, broadly applied, may well have played a role at least in popular versions of universal Darwinism (von Sydow, in press). As such this seems connected to the observation of biologists Gould and Lewontin, that adaptive explanations are sometimes nothing but ad hoc 'just-so-stories'. Interestingly, moreover, it was Popper who pointed out that a "considerable part of Darwinism is not of the nature of an empirical theory, but is a logical truism." (1972, p. 69). This is particularly noteworthy, since he modeled his own approach on an analogy to Darwinism.

Conclusion

Outlined here are only a few possible discussions of the metaphysical arguments, with no claim at providing a definitive result. Significantly, the apparently positivist approach of a universal Darwinism appears to revive the philosophical disputes on metaphysical issues in a way that seems relevant to several scientific domains. Other interesting topics in Darwinian metaphysics (particularly for process-Darwinism) concern conceptual and empirical issues. Are mutations, trials, conjectures, innovations, and new ideas actually strictly blind? Is selection strictly external or environmental? Is variation sometimes supplemented by synthesis? These are controversial matters, partly raised concurrently in varying domains of process-Darwinism (e.g., Gabora 2005, Hodgson 2002, von Sydow 2012). This, however, brings us back to the earlier point made about tautological definitions. That is, it may depend on our definition whether we define Darwinian processes so widely that Darwinian metaphysics becomes almost a truism, or whether we define them as rigidly as possible, with the result that they become false almost by definition. Within metaphysics, one generally preaches to the converted if one argues that – beside factual issues – definitional issues often decide over the truth or falsity of theories or even of metaphysical systems of theories. However, in Darwinian metaphysics it seems clear that a greater awareness of definitional practices and implications may be helpful.

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There is a place where we are always alone with our own mortality, where we must simply have something greater than ourselves to hold onto – God or history or politics or literature or a belief in the healing powers of love, or even righteous anger … A reason to believe, a way to take the world by the throat and insist that there is more to this life than we have ever imagined.

Dorothy Allison

Darwinism's Impact on Christian Theology[1]

Christopher Southgate

Introduction

I shall take Darwinism to include not only Darwin's own basic schema of descent with modification, which depends on the heritability of spontaneously occurring variation between individuals of a species, and on competition for resources, leading to natural selection, but also the combination of that scheme first with genetics and then molecular biology, and more recently with the insights of developmental systems theory and self-organisation. I shall also touch, not without certain scepticism, on the expansion of Darwinism into the areas of sociobiology and evolutionary psychology.

It is widely supposed, particularly on the basis of the work of the boldest exponents of the latter two theories, that Darwinism is the arch-foe of Christian thought, liable at any moment to put it out of business. E.O. Wilson writes that:

> [W]e have come to the crucial stage in the history of biology when religion itself is subject to the explanations of the natural sciences . . . sociobiology can account for the very origin of mythology by the

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1 This essay is adapted from a lecture given for the Copenhagen University Network of Science and Religion on June 2 2009. A version of part of this text will appear in 'Re-reading Genesis, John and Job: a Christian's response to Darwinism' in *Zygon: Journal of Religion and Science*, June 2011.

> principle of natural selection acting on the genetically evolving material structure of the human brain.

If this interpretation is correct, the final decisive edge enjoyed by scientific naturalism will come from its capacity to explain traditional religion, its chief competitor, as a wholly material phenomenon. (Wilson 1978, 192)

And that sort of polemical statement has fuelled the fear driving that strange phenomenon, creationism, and its contemporary cousin, intelligent design. On the other hand, there has been willingness among some theologians - I think particularly of Arthur Peacocke to whom I personally owe so much - to try and reclaim Darwinism as 'the disguised friend' of Christianity. Peacocke draws on the work of the 19th Century theologian Aubrey Moore, who wrote:

> The one absolutely impossible conception of God, in the present day, is that which represents him as an occasional visitor. Science has pushed the deist's God further and further away, and at the moment when it seemed as if he would be thrust out all together Darwinism appeared, and, under the disguise of a foe, did the work of a friend. It has conferred upon philosophy and religion an inestimable benefit, by showing us that we must choose between

> two alternatives. Either God is everywhere present in nature, or he is nowhere.2

Moore is claiming that evolution can liberate theology from too static and deist a view of the creator, and allow theologians to develop a view of a God who 'makes the world make itself'. Such a view might also, it was thought by early Christian apologists for Darwinism such as Asa Gray, ease the problem of theodicy posed by the understanding, which grew steadily as science advanced, that nature is 'red in tooth and claw', characterised by competition for scarce resources, and therefore by widespread suffering and the extinction of most of the species that have ever lived. John Hedley Brooke, writing of this period, notes that 'a process in which the laws were designed but the details left to chance might explain nature's more repulsive products without having to ascribe them directly to divine action' (Brooke 2003, 206).

In the remainder of this essay I shall touch on five areas in which Darwinism may be – or is often thought to be – a challenge to the framework of Christian thought. I shall show that two of these areas need not be seen as problematic – if anything, they help clarify issues for theologians. On a third, the scientific explanation of religious belief, I think it is still too early to tell what the impact will be – though I shall offer some pointers. A related area is the question of early human evolution and what part religion played in it, and how and whether Christians can defend the notion that humans are in the image and likeness of God. The final issue is that same one of the problem of suffering in evolution that I mentioned above. This remains a huge and underexplored puzzle for Christianity, one which has received too little attention precisely because of the way polarised voices on the other issues have been able to shout louder. I shall indicate why some traditional theological moves will not work in relation to this problem, and just a few ways in which I think it might be explored.

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2 Quoted in Peacocke 2001, 136. This motif of Darwinism as the disguised friend of Christianity has been a particular influence on Peacocke, and is also found in the writing of John F. Haught – see Haught 2000, especially Ch. 4.

I shall conclude finally that Darwinism, understood in its broadest sense, is neither the death-knell of Christianity nor its disguised friend, but offers Christians a powerful and beautiful, but deeply troubling narrative, one which challenges theologians to probe more deeply and honestly what we can and cannot say about the God who made us.

I write as a practising Christian, committed to a view of all created reality as made out of absolutely nothing through the loving purposes of a God who can be known as Father, Son and Holy Spirit, a God who has acted to save creation, and will ultimately transform it. In stating that I recognise that many of my readers may not share that conviction, or would express it in different ways.

The first three challenges

First and simplest, at least on initial inspection, the evolutionary narrative that unfolded in the 19th century - the biosphere having evolved very gradually over a vast length of time - makes unsustainable a literal reading of Genesis 1 in terms of a six-day creation. There are of course all sorts of other reasons for not reading Genesis 1 literally, including its internal puzzles about how one can have days before the creation of the sun, and its tensions with the second creation account in Genesis 2. So this matter, surely, need not delay us long. Except just to note for further discussion later that the reading of Genesis 3 in terms of a fall of the whole creation, occasioned by the sin of Adam, has been a very tempting way of accounting for suffering in creation, and that reading too comes under criticism in an evolutionary understanding. I return to this question below.

The second and related problem is that of design, a term that the intelligent design movement has given a bad name. It is worth noting that neither of those two very different creation stories in Genesis 1 and 2 describes God as designer of a mechanism. Indeed the first account, to which literalist interpreters seem principally drawn, uses two very different, characteristically theological expressions for the divine activity. First, the verb bara’ - in its Qal form only used for God’s activity, hence, by inference, for what God alone can do - bring an entity into existence

from absolutely nothing. Thereafter we read the sonorously repeated claim that God spoke a series of jussives, those great 'let-there-be's- by which creation unfolded, and in each case it was so. Both of these are a far cry from the careful mechanical artificer inferred by Archdeacon William Paley from his studies of biological adaptation. It is one of the curiosities of the contemporary debate on intelligent design that in an effort to demonstrate God by reasoning about the natural world it so seriously presumes upon the biblical text.

The third challenge that was very important to the nineteenth century debate was Darwin's indication, most explicitly in his The Descent of Man (1871), that the human being must be regarded as one evolved animal among many, rather than the utterly distinctive and distinctively ensouled creature that the Christian tradition had understood it to be. The debate about human uniqueness rages to and fro. Of course, we can now accept, as thinkers 150 years ago would have found more difficult, that the way our bodies are put together is very closely related to that of many other creatures, our own nearest cousins the other primates, but also other mammals. The complete sequence of the mouse genome has recently been solved. It shows more similarities with the human than had been anticipated (interestingly it is in the areas relating to sexual expression that the differences are most marked). All this reminds us that we should be very grateful for the similarities between our biochemistry and physiology and that of other organisms, because it is on that that so much of medical research has been based. Having reached a stage of my life in which I take a whole variety of medications I am very much aware of the importance of all that work in bacterial and animal systems. I am inspired, too, rather than repelled, by the thought that the complex of genes that controlled my development as an embryo and gave me this body of mine, is profoundly ancient, and shared with a wide variety of vertebrates. So it is good that we are animals, and good too that we remember how dependent we are in all sorts of ways on the rest of the biosphere, from the bacteria in our gut to the photosynthesists that allow us to breathe, and even the marine organisms whose use of sulphur betaines to combat salt stress allows the recycling of marine sulphur back onto the land.

So humans should celebrate our relatedness to other organisms, and not be threatened by it. What tends to threaten us, however, is not

biochemistry, but the thought that our moral and spiritual life might not be distinctive. Again, as I say, the science is fluid. For every development that tells us that other animals possess sophisticated social and even proto-moral behaviour, there is another that reminds us of the extraordinary powers of learning that humans possess, and the extraordinary sophistication of our self-consciousness and theory of other minds. Strangely enough, when I was drafting the lecture on which this essay is based, on a British train journey, I fell into conversation with a social psychologist who was telling me that humans are believed to be the only species in which adults use crying as emotional release and for the communication of emotion, and that there is recent work suggesting this might have been a great breakthrough in the evolution of human sociality.[3]

So I fail to see that our distinctiveness is meaningfully threatened. It is moreover affirmed, for Christians, by the Incarnation. It was as a human that God, in the words of the Gospel of John, took flesh and dwelt among us. To record this is not to deny the very important concept of 'deep incarnation' of which Niels Gregersen has written: Christ died an evolutionary victim – an organism without offspring (Gregersen 2001). I shall return to this point of Gregersen's later. But humanity is forever affirmed and blessed by the Incarnation. Indeed, in the project Andrew Robinson and I are currently pursuing, the Incarnation offers us some very interesting questions to pose about human evolution. The project concerns an effort to understand God and creatures in terms of semiotics, the study of signs. So two very simple but intriguing questions present themselves when humans are understood as evolved animals, within such a semiotic understanding. First, what sort of sign of the life of God was Jesus, and what was it about the human as an evolved animal that allowed that sort of sign to be embodied? Here we can see how the scheme of Darwinian evolution, combined with the philosophical resources of semiotics, can allow traditional theological questions to be posed in new and generative ways.[4]

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3 I thank Dr Abi Millings for these insights. See also Tallis 2008, 37-44.

4 Some of this work has been published as Southgate and Robinson 2010; Robinson and Southgate 2010a, b and c. See also Robinson 2010 for an extended treatment of these ideas.

There are other questions that an evolutionary scheme poses for the understanding of human beings, in particular in relation to the famous text in Genesis 1 about humans being created in the image and likeness of God. Note that the sort of interpretative move I made just now in relation to issues of literal reading will not help us here. It is one thing to dismiss the literal chronology of the Genesis 1 creation account, and quite another to try and avoid the issue of the status of humanity in relation to creation, which is a theological rather than a scientific statement, a statement about value and vocation. It is a statement that has properly become a foundational element in Christian anthropology, and much energy continues to go into exploring how the image of God might be understood. I do not have space here to explore the various options: seeing the image of God as substantive, as functional, as relational, as eschatological.[5] But I offer here a suggestion that coheres with the theology of evolution I outline in my recent book. (Southgate 2008).

This suggestion is based on an understanding of God's nature as Trinity as being of perfectly self-giving love. There is no selfishness in God, but only the perfect transcendence of self in loving relation. And if we understand the image and likeness of God as being the imago Trinitatis, then we can understand it not so much as that perfect self-giving, which is the life of God in Godself, but as the capacity to respond to self-giving love. Each of the persons of the Trinity responds to the self-giving love of the others, and each human is called to respond to, and be transformed by, the self-giving love of God as Trinity. This is a view which is substantive, in proposing that humans have evolved an attribute of being capable of responding to love by transcending our selfish impulses – and it is clearly relational, and it is functional – this response is our calling, to be worked in our relationships with each other and the whole creation, and it is eschatological – the image is only now being perfected by the transforming work of salvation in Christ.

This formulation may help to address the questions that evolution poses about human nature – in particular the questions: when and how did the image of God arise; did it inhere in any of our hominid cousins, now all extinct; how does that relate to the question of whether those

5 These options are laid out in Herzfeld 2002, Ch.2 – see also van Huyssteen 2006, Ch.3.

creatures can be 'saved' into the resurrection life of God? Wherever we see self-giving, costly relating to others for others' sake, we see the image beginning to develop, and we should not be afraid to see this proto-image in other primates, or indeed in elephants and other animals. One of the few things we know of Neanderthals is that they looked after individuals past child-bearing age who had broken limbs, and severe arthritis – here we see, implicitly, signs of self-giving behaviour after the image of God, and hence, arguably, signs of Neanderthals being drawn up into the life of God. Such a view of salvation is not a narrow one; indeed I argue below that every creature has some sort of prospect of a resurrected life. So some of the theological drivers for a strong view of human uniqueness are simply not present in my scheme.

Clearly, such a view of the imago Dei - as the capacity to respond to self-giving love - will suggest that it developed gradually in humans and is still developing, indeed that it needed for its full fruition the Incarnation and work of Christ. There was no sudden moment when God switched on the image in humans, though surely a theology of creation based on a Trinity of self-giving love will want to suppose that God is always seeking to call out self-transcendence from God's creatures, each according to its own evolved capacities. And although we know so little about the way humans evolved their current sense of self, theory of mind, potential for altruism, there are some recent inferences as to the significance of what is often called 'cave-art' which may possibly help us. I am thinking of the work of David Lewis-Williams and others, and the theological reflections of Wentzel van Huyssteen in particular (cf. Lewis-Williams 2002; van Huyssteen 2006). Lewis-Williams has shown how cave-art is best seen not as representational art in the modern sense, but as a reaching into the spirit-world. Van Huyssteen has explored the possibility that religion was an important element in the development of the cognitive fluidity that characterises modern human intelligence.

So an impulse to respond to the divine love of the creator comes to be seen, on this view, not as an extra, a spandrel, in Stephen Jay Gould's terminology (Gould and Lewontin 1979), engendered by the evolution of human consciousness, but actually as a key catalyst in that evolution. Put theologically, this could be seen as a hint that responding to God's calling helped to form the self-consciousness of the modern human, and hence an enhanced potential to respond in self-giving love – ultimately

the potential to recognise and respond to the sign of God that is the life, death and resurrection of Jesus.

The Challenge of Sociobiology

Readers will be well aware that the argument mounted above can be run the other way, to show that religion had its evolutionary uses and that that explains its existence and its long persistence in the human psyche. Here we are back in the territory of that passage from E.O. Wilson I quoted at the beginning of this essay, and very challenging territory it is for the theologian. If Darwinian science can explain why early humans needed religion, whether to enhance predator-detection, or to develop cognitive fluidity, or to ensure tribal cohesion, or to ward off the growing awareness of mortality, whatever theory is adopted, then there is a risk that Darwinian science can explain religion away. This is, effectively, the move that Wilson makes, and Dawkins has made a similar proposal, couched in his usual inflammatory rhetoric when he describes religions as 'viruses of the mind'. (Dawkins 2003, Ch.3) They are interestingly different. Both reject the truth-claims of religion, yet Wilson has written movingly of the prophetic role religious figures could play in helping humanity respond to the ecological crisis, (Wilson 2002; 2006) whereas Dawkins is convinced that religion is an altogether pernicious lie, a virus of the mind, and must be eradicated if at all possible (cf. also Dawkins 2006).

In a sense the explaining-away of religious truth-claims is no more than a scientific elaboration of the challenges posed long ago by Marx and Feuerbach. Religion provides comfort, social cohesion, refuge from the existential terrors of being alive and conscious of being alive. But it is a telling elaboration, and as I said at the beginning I think it is too soon to see how these sociobiological accounts of human cognitive evolution will fare. Paleoanthropology is a frustrating science, necessarily profoundly underdetermined by its data, and lurching forward as different finds and different theoretical frameworks pull it about. We can be more confident that twenty years of combining contemporary genetics with real-time brain scanning will tell us a great deal about how genetic inheritance

might affect cognitive predispositions, and I think we shall be wise not to conclude too much too early on that score. I do not think that as a Christian I shall ever be able to persuade Richard Dawkins that the faith by which I live is not a toxic, pathogenic virus in my mind. But equally, I do not think that such theories can ever evacuate religious faith of its truth-claims. Believers do not offer objective, falsifiable scientific evidence for God, and their claim to the authenticity of their experience of divine revelation cannot be falsified by science.

The Greatest Challenge

That brings me to the last and what I would see as the greatest challenge Darwinism poses to Christian theology, the problem of the vast extent of suffering of creatures over several hundred million years, suffering moreover that seems intrinsic to the evolutionary process. Not that this can act as a falsifier of belief in the existence of a creating and redeeming God. We are no longer eighteenth-century natural theologians, seeking to demonstrate the truth of the core of our faith by what the natural sciences tell us about the world. But we do need to be in Ian Barbour's phrase 'theologians of nature', (Barbour 1997, Ch.4) taking very seriously the conversation with the sciences and allowing it honestly and profoundly to affect how we understand God's ways with the world.

How might a contemporary theologian of nature address the problem of suffering in evolution? The first step, I consider, is to affirm the reality of creaturely suffering, and of the disvalue that is the extinction of species. We need to be realistic about these things. Even in Copenhagen, so famous for the fairy-tale among other things, there must be no spuriously romantic fairy-tales about the suffering of non-human creatures. We must not imagine that it is like human suffering, or that it contains the sort of crushing of hope that advanced theory of mind makes possible. Nor should we imagine that pain, by itself, is necessarily a bad thing – it is a vital element in being alive as a complex organism. But acute observation of animals does show us something more than mere pain – it shows us the distress of creatures caught in severe trauma, especially as they experience trauma from which there is no possibility of

release. Death from predators is sometimes quick, but sometimes not. It may take a leopard over a minute to bring down a full-grown antelope. A whale may be literally eaten alive by sharks or killer whales, over a period of hours. On the BBC programmes narrated by David Attenborough for the 'Darwin year' of 2009, there was dramatic footage of young lions close to starvation, calling plaintively for their pride, who up ahead, out of earshot, were calling plaintively back. And one of the young lions just simply did starve to death, out on the open plain. It is impossible not to regard this experience as one of suffering. Neurophysiological studies on creatures in distress show similar patterns of hormone and neurotransmitter release to those found in humans. So – with all due cautions – it is reasonable to regard creaturely suffering as real, across a certain range of types of creature advanced enough to feel such.

What of extinction? Again we must be realistic. Species, arguably, have natural spans of effectiveness, after which their viability disappears because of competition or environmental change. (As an aside, a chilling possibility in the current era is that the human species may be in such a phase. One of the tragedies of 2009 was the relative failure of the Copenhagen summit on climate change.)[6]

But extinction removes from the biosphere, forever, a certain strategy of being alive, a certain way, to pick up an important motif from the Psalms, in which God is praised by God's creation. So extinction is always a disvalue. Extinction may benefit a whole range of other future species - the loss of the dinosaurs meant that other possibilities could be explored, but it remains a tragic loss to creation, a loss therefore also to God's own experience of that creation.

So the Darwinian world is full of the disvalues of suffering and extinction, and an emphasis on natural selection will suggest that these are an inevitable part of the evolutionary process. That in itself is a challenge to the goodness of a creator God. How could the God of love give rise to such a world?[7]

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[6] For a commentary see Deane-Drummond 2011.

[7] Aside from my own monograph *The Groaning of Creation* (Southgate 2008), there are very few recent studies of this problem of any length. A notable exception is

At this point I have to address the major answer that, classically, Christian theology has given to the existence of suffering in creation, namely the doctrine of the Fall. It was straightforward, and all too tempting, until the rise of an old-Earth evolutionary narrative, to ascribe the apparent distortion of all that God had made (and behold, in the words of Genesis 1.31, God saw to be 'very good') to the effect of human sin. We can be clear now that that is simply an understandable pre-scientific anachronism – yes it is true that modern humans have been devastators of their environments and precipitators of many extinctions, but we also know that processes of predation and disease, and other much larger extinction events, preceded the evolution of humankind. Human sin did not cause nature to be in Tennyson's phrase 'red in tooth and claw' (Tennyson 1989, 399).

There remains the possibility of a fall of creation caused by primordial angelic rebellion, or some other mysterious cause. This suffers from two major problems, one theological and the other scientific. Theologically, it places another power of comparable force to God at work in the processes of creation, a power capable of frustrating the purposes of the creator at every turn. Put simply, a narrative of creation that depends on such a frustrating power as the source of all violence and suffering in the creation implies that God desired to create straw-eating lions (cf. Isa. 11:7), and this power was able to prevent God from doing so. This is at variance with all that the tradition has wanted to confess in terms of God's sovereignty and creation ex nihilo. Scientifically, a primordial fall is problematic because it ignores the point that it is the very processes that involve creaturely suffering that engender creaturely sophistication, and intricacy and diversity of function.

Fall-thinking is such a strong instinct among theologians that a number have wanted to insist that God did not create processes of competition and predation. I myself think the arguments I give above are conclusive, and that one does fatal damage to the conversation between science and theology by dissecting out the evolutionary process into the bits one likes and ascribes to God and the bits one considers chaotic and

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Michael Murray's philosophical essay *Nature Red in Tooth and Claw* (Murray 2008). Significant short treatments include Rolston 2003; Attfield 2006; Edwards 2006.

meontic and ascribes to another power. But I admit there are problems on both sides. Because I say that the biosphere has always contained competition and predation, and therefore the possibility of the disvalues of suffering and extinction, I have to give some account of what Genesis 1.31 might mean by asserting that all God made was very good. This was my suggestion in *The Groaning of Creation*:

> a strong emphasis within contemporary Christian theology is on creation as a continuous process, rather than something completed at the beginning of time. For this reason I am happy to accept John Haught's point that creation is 'unfinished' [Haught 2000, Ch.9] and to side with Wolfhart Pannenberg's conclusion that 'Only in the light of the eschatological consummation may [the verdict 'very good'] be said of our world as it is in all its confusion and pain.') [Pannenberg 1998, 645]. Colin Gunton in his reappropriation of the theology of Irenaeus of Lyons claims that 'good means precisely that which is destined for perfection.' [Gunton 1998, 56] Creation then will finally be very good at the eschaton, when God will be all in all (1. Cor. 15.28), and God's Sabbath rest will be with God's creation (Southgate 2008, 17).

I also have to say – and this is the first plank in my constructive proposal in evolutionary theodicy – that a world of competition and natural selection was the only way God could give rise to creaturely values of the sort we know to have evolved in the biosphere of Earth.

At once I hear an objection – that this too is a breach with the doctrine of creation ex nihilo – with the Christian confession that all that is came absolutely out of nothing solely by the fiat of God. What is this constraint that I have just invoked – that a Darwinian world was the only way to give rise to beauty, diversity and complexity in creation? Here is a constraint that seems to co-exist with God from eternity, so for the philosophical theologian it is problematic. Surely God could have made creaturely beauty and diversity out of any materials and processes God liked? Whereas for anyone trained in the natural sciences it's a very plausible constraint – philosophers can dream up all sorts of alternative worlds, but the only way in which we know matter 'works' and gives rise to life is this way, and the only way this type of life evolves and gives rise to novel and excellent adaptations, creaturely selves of all types and ingenuities, is via Darwinian natural selection, driven by competition, predation and extinction.

Is that enough, then? Can one simply retort to whoever complains at God that this is the best system for generating creaturely value, however great the cost? Most biologists would be inclined to respond in these terms, to say that nature is a 'package deal' (e.g. Gregersen 2001, 201). You can't have the values without the disvalues. End of story. But I have argued strongly that that by itself is not an adequate defence of the goodness of God. God is not merely the God of systems, but of individual creatures. It is not enough to say to the limping impala calf picked off by hyenas, or to the second pelican chick pushed out of the nest to starve by its stronger sibling, to creatures whose lives know no flourishing, that God is the God of the system and the system is a package deal, the bad with the good. So the first element in my theodicy of evolution, the 'only way' argument, cannot subsist by itself, despite the lucid efforts of thinkers such as Robin Attfield to advance it (Attfield 2006, Chs 6-7). It needs to be supplemented by other theological resources.

First, the need to invoke the co-suffering of God with all creatures, an increasing emphasis in 20th Century theology, and applied to the non-

human world in the work of theologians such as Arthur Peacocke and Jay McDaniel. (E.g. Peacocke 2001b; McDaniel 1989) Every theologian would concede that God is present to every creature both in its flourishing and its suffering, and that therefore no creature suffers or dies alone. In the Christian tradition this suffering is focused and exemplified at the Cross in a way that inaugurates the transformation of the world, and Niels Gregersen's work on 'deep incarnation' emphasizes the solidarity of Christ not merely with humans but with all creatures and particularly the victims of evolution. (Gregersen 2001) So it is a short step from there to the supposition that God does indeed suffer with every suffering creature, and that that suffering, at some deep existential level, makes a difference, both to God and to the creature.

Second, the need to suggest that creatures whose lives know no fulfilment may experience fullness of life in some eschatological reality, a 'pelican heaven' in McDaniel's phrase (1989, 45). A number of theologians have explored this line recently, including Robert J. Russell, Denis Edwards and Ernst Conradie (Edwards 2006; Russell 2008; Conradie 2002). If we take altogether seriously the loving character and purposes of God I think we cannot believe that lives consisting of nothing but suffering are the end for those creatures that experience them. How many other animals there may be in heaven, other than those that are so evidently the victims of the evolutionary process, I am of course not able to say. All I can tell you is that I believe there is no shortage of room in heaven. This sort of thinking of course provokes the hard question – why then did God not simply just create heaven? That is always a hard question for the theist.[8]

The final element in what I have called a 'compound evolutionary theodicy', relying on a number of different inferences in combination in order to understand the ways of a good God in a Darwinian world, is an account of the calling of human beings as co-redeemers with God. But just before I explore that, please note where this engagement with evolutionary theodicy has taken us. We have had to part company with the notion of a perfectly good initial creation, corrupted by some mysterious process. So we have had to accept the profound ambiguity of

8 Posed with his characteristic sharpness by Wesley Wildman (2007).

that creation – as 'very good' in the words of Genesis but also 'groaning in travail' in the words of St Paul at Rom. 8.22.[9] We have also had to abandon the perfect impassibility of God so beloved of classical tradition, in favour of a God who grieves and laments with suffering creatures, very possibly in the very same process in which God takes joy from the flourishing of other creatures. And we have had to abandon the conviction – also strong in the tradition – that animals have no souls and know no redemption, in favour of a view of a heaven rich in creaturely diversity. I claim that this sort of reflection on creaturely suffering is deeply troubling to the Christian thinker, and yet necessary and ultimately enriching, productive of a view of God as deeply engaged with every thread of the fabric of life.

How then can we understand the calling of the human being, in the face of this engagement between Darwinian thought of the theology of creation and redemption? Is this last bit of the discussion above just a game for theodicists with not enough to do, or are there ethical implications for the way human life is to be lived in response to the Gospel of Christ? I have pondered long on the passage from the Letter to the Romans that I quoted above. It is a fascinating text, frustratingly brief and allusive. And to read Rom. 8.19-22 as a post-Darwinian modern is very different from responding to it in its original context. But I think one can safely infer that Paul sees the era beyond the resurrection of Christ as the eschatological era, one in which humans come into the glory of knowing their true freedom. And the Apostle says something very intriguing, which at the same time makes a huge amount of sense to humans trying to confront the extent of our ecological depredations. He implies, in the language of vv. 19, 21, that the glory of creation's own liberation in some way depends on humans coming into their full glory as free creatures in Christ. So the ecologist's prediction that creation will only cease to groan when humans can live harmoniously and sustainably with other creatures is matched by Paul's theological instinct that our struggle to be transformed, in the words of 2 Corinthians, 'from one degree of glory to another' is necessary to the final freeing of the non-human creation at the eschaton.

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9 See Horrell *et al* 2010 for a detailed exploration of the interpretation of this text.

What might this mean for ethics? Certainly human lifestyles liberated from the idolatries of greed and over-consumption, with the freedom to learn wisdom from the Spirit of God. And surely we have never stood so badly in need of wisdom, the wisdom that transcends our evolved instincts to care narrowly for ourselves, our kin and our tribe, and which is willing to work for the flourishing of the human race beyond the lifespan of our grandchildren. But I make a more radical suggestion – namely that as an eschatological sign we should seek to reduce the rate of biological extinction, below even its natural level. Note that this is a proposal that makes little sense within a naturalistic framework that merely reads off nature-as-it-should-be from nature-as-it-is. Only in a theological ethic that holds that this is the last phase of creation, the one in which God is gathering all things together in Christ, does it make sense to believe that the old biological driver, extinction, is no longer needed. But I believe that within a Christian ethic using the Romans text as a springboard a proposal to reduce biological extinction makes abundant sense. We cannot have any purchase on getting leopards to lie down with kids, but we can, it seems to me, participate in the redemption of creation from its 'futility' by seeking to reduce the rate of extinction. Unfortunately our current activities are exactly in the wrong direction, and even modest assessments of the impact of a 2-3 degree rise in global mean surface temperature imply that we could be raising the natural rate of extinction by a factor of a thousand. All the more reason, then, to contemplate the possibility that our calling lies radically in the other direction.

Conclusion

I hope the above discussion conveys something of the richness and the ambiguity of the conversation between Darwinism and Christian thought, and also that evolutionary theory is not simply either the disguised friend, or yet the implacable enemy, of a reasonable faith.

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God's Quality and Creation's Longing

Andrew Robinson

Introduction

I would like to respond to Christopher Southgate's lecture by making some very brief and tentative remarks connected with a direction that I have recently been following in my own thinking. Specifically, I will say something about an approach to the concepts of sacrifice and victimhood that draws on the work of René Girard, I will try to indicate how those ideas might fit with my own work on semiotics and Trinitarian theology, and I will then hint at how I think such an approach might tie in with Southgate's approach to the tasks to which humans may be called in the fulfilment of God's creative purposes.

Sacrifice and victimhood

I have come upon Girard's thought via the Catholic theologian James Alison, and I hope the following couple of paragraphs do not too badly misrepresent the core of the latter's approach.[10] According to Alison's reading of Girard, human groups and societies are universally characterized by a tendency to seek unity by defining themselves over and against other individuals or groups. The group then consolidates its own identity by excluding, victimizing or sacrificing these non-belonging 'others'. This process may lead to actual violence between groups and individuals, or it may become ritualized in the form of cultic sacrifices, in which the sacrificial offering is taken to in some way purify the offerers of the sacrifice. The concept of the 'scapegoat', deriving from the

[10] See, for example, James Alison, Raising Abel, New Edition, London: SPCK (2010); Broken Hearts and New Creations: Intimations of a Great Reversal, London: Darton, Longman and Todd (2010).

Hebrew festival of atonement is paradigmatic of this ritualization of an underlying social and anthropological process.[11]

According to Alison, Jesus' sacrifice on the cross may be understood as the ultimate instantiation of this scapegoating mechanism, and also it's undoing. Jesus, by virtue of being the perfectly innocent victim of the lynch-mob, brings to light the futility of the social drive to win God's approval by sacrificing those whom we suspect of being less deserving of God's love. Furthermore, in his resurrection Jesus is vindicated as having perfectly embodied the quality of God's being in the fabric of the created order, and, crucially, he returns not seeking vengeance (as would most victims) but offering peace and forgiveness. In doing so he un-does the power of the scapegoat mechanism once and for all, and detoxifies the space of victimhood and death which hangs over all creatures. From now on, by turning to the one who has defeated death and has freed human beings from the self-imposed tyranny of survival by victimization, humans can live lives that are not run by the fear of death or the need to define themselves as those who 'belong', over and against those who do not.

The above is the briefest of sketches of what I sense may well be a rather profound insight into the human condition and an associated way of understanding the redeeming power of Jesus' life, death and resurrection. How does such an approach fit with my own work on semiotics and Christian theology? Briefly, I have been pursuing the hypothesis that the structure of semiotic processes in the world - processes of representation, meaning, and interpretation - is analogous to the threefold being of God known through reflection on the role of Jesus in the economy of salvation.[12] To put it at its bluntest, the Son or Word is other than the Father and is able to represent him. The Spirit is the one who interprets the Word of the Father, making the Word lively and intelligible by virtue of her role of mediation. The categories of 'otherness' and 'mediation' are, I suggest, primordial and fundamental categories, and together with another category, which is almost beyond naming but which might go by the word 'ingenerateness' or

[11] Alison, Broken Hearts and New Creations, pp. 217-218.
[12] Andrew Robinson, God and the World of Signs: Trinity, Evolution and the Metaphysical Semiotics of C.S. Peirce, Leiden: Brill (2010)

'unoriginateness', make up a Trinity of being which is the pattern of God's eternal dynamic and which is reflected in analogous threefold patterns in the created order. To put this in terms of a concept with deep roots in the Christian tradition, the triadic patterns of semiosis in the world are 'vestiges of the Trinity in creation'.

This 'semiotic model' of the Trinity draws on the triadic semiotics and system of categories of the American philosopher, scientist, and semiotician, C.S. Peirce. Peirce developed a multi-dimensional taxonomy of signs, of which the best known dimension is that concerning the relation of signs to their objects, a relation which may be iconic (a relation of resemblance), indexical (a direct or causal relation), or symbolic (where sign and object are related by convention). But there is a less well known dimension of Peirce's taxonomy which concerns the nature of the 'sign-vehicle' in itself. Thus legisigns are signs produced according to a rule (as when I use my pencil to form a letter A); sinsigns are signs that signify 'singularly' (in an instance by instance way, not by virtue of being formed according to a rule). Finally, qualisigns are signs that signify by embodying the quality signified. When we use a colour sample to choose a colour of paint or fabric we are using a qualisign: the colour chart is a set of qualisigns which embody exactly that which is signified, namely, the colour in question. Importantly, it may be that some qualities, and therefore some qualisigns, can only be instantiated in a particular kind of 'fabric'.

Southgate mentions two questions that he and I have grappled with together: what kind of sign is Jesus of God, and what enables that sort of sign to be embodied? The answer to the first question, according to my semiotic model, is that Jesus was a qualisign of the being of God - an embodiment of the exact quality of God's being. As the letter to the Hebrews puts it, Jesus was "the exact reflection of God's glory and the exact imprint of God's very being (Hebrews 1:3). The answer to the second part of the question, according to this approach, is that the kind of fabric required for the embodiment of such a sign is the fabric of a human life. In Jesus' case his whole life, including his willingness to suffer a victim's death, embodied precisely that quality. In doing so Jesus showed himself to be the eternal Word of the Father, the expression of the Father that perfectly represented the Father's being. In other words, Jesus was 'the image of the invisible God' (Colossians 1: 15).

Importantly, and consistent with Alison's Girardian approach, it was not the Cross in isolation that was of redeeming significance. God did not wish a violent and unjust death on this innocent human being. Rather, the Cross was the culmination of the total quality of Jesus' life, the ultimate and inevitable manifestation of his quality of self-giving love. In a semiotic perspective, this total quality of love is the in-breaking into the world of the sign of God's being, an in-breaking that shows that death is not the last word, that humans can escape from the zero-sum game of survival by violence and victimization.

Putting the Girardian perspective in semiotic terms, the Spirit enables us to turn to Christ, the qualisign of the Father, and in so turning to and interpreting that sign we become caught up and drawn into the very life of God's own eternal self-expression and self-interpretation. And in being so caught up and drawn into God's own self-expression and self-interpretation we become participants in the divine nature (2 Peter 1: 4) and escape from the tyranny of the fear of death and the need to violate and victimize others in order to escape it. For the very sign that orientates us to God the Father is the same sign that detoxifies death by occupying the space of victimhood and returning from it offering peace and forgiveness.

Girard and Southgate

So finally I'm now in a position to give some tentative hints about how I would see this way of thinking playing out in the context of Southgate's very rich account of the role of humans in the evolutionary project. I shall suggest one point of possible difference and another of potential integration. The point of difference relates to Southgate's view of the intra-Trinitarian relations and the human relationship to those relations. Southgate says:

> And if we understand the image and likeness of God as being the imago Trinitatis, then we can understand it not so much as that

> perfect self-giving, which is the life of God in Godself, but as the capacity to respond to self-giving love. Each of the persons of the Trinity responds to the self-giving love of the others, and each human is called to respond to, and be transformed by, the self-giving love of God as Trinity.

This, I take it, endorses a 'social' model of the Trinity, in that the acts and responses of each 'person' are taken to be essentially similar: 'each responds to the self-giving love of the others'. The alternative to a 'social' model of the Trinity is usually taken to be some kind of 'psychological' model, traceable back to Augustine's famous psychological analogies. My proposal for a 'semiotic model' of the Trinity has affinities with, and differences from, both of those traditional approaches.[13] Of course, if the debates about the relative merits of these various 'models' amounted to nothing more than speculative theorizing about the inner being of God then we would have drifted a very long way from the roots of Trinitarian thinking in reflection on the saving work of Jesus of Nazareth. But I think there is more at issue here than theoretical speculation. Specifically, I think that the semiotic approach makes it easier to understand, and therefore to enact, how humans may be drawn into the life-giving dynamic of the Trinity. For if the Trinitarian persons are all persons in essentially the same way, giving and receiving the perfections of divine love, then all humans can hope to do is to respond to that love, perhaps by (imperfectly) imitating it. In contrast, according to the semiotic model, the Word perfectly expresses the very quality of God's-self, the quality of love that is God (cf. 1 John 4: 16), and the Spirit enables this sign of God (the Father) to be interpreted in such a way that the (creaturely) interpreter is drawn into the very life of God's own self. The roles of Father, Son, and Spirit are therefore distinct (though inseparable). The response of the creature to the qualisign of God's-self may indeed involve the creature in showing just the self-

[13] Robinson, God and the World of Signs, pp. 314-329.

giving love that was manifest in the life and death of Jesus. The difference between the semiotic and the social formulation of the significance of such creaturely

> imaging' of God is that the semiotic approach gives a clearer sense of the way in which this creaturely response may be caught up into the self-giving, self-interpreting, life of God, and how the creature (or community of creatures) may then themselves constitute a new sign of God's being, a sign that may draw further creaturely responses, and so on. That, in fact, is what I understand Paul to mean when he refers to the Church as 'the body of Christ (1 Corinthians 12: 27).

And so to my point of integration with Southgate's account. Here I wish to pick up his idea, arising from reflection on Romans 8, that humans in some way share the task of bringing creation to its eschatological fulfilment. Southgate's suggestion is that one mark of this would be to attempt to reduce the rate of species extinction below the background rate of extinction that would be expected in the absence of human influences. Let me express this in terms of Alison's Girardian approach. In the normal run of things, biological individuals and species compete with one another for food and other resources. They cheat death only at the expense of other individuals. Individuals and entire species become victims of the process, sacrificed for the 'good' of the survival of others. Non-human creatures are unable to step outside the circle of violence and victimization necessary to their (temporary) dodging of death. Only the human creature is able to respond to the embodied qualisign of God's being by seeing that survival by the creation of victims and scapegoats leads only to a tyranny of futile acts of violence against those apparently

less deserving of survival. And only the human creature, who has been approached by the risen and forgiving victim, the sign inviting participation in the eternal life that is not defined by death, is in a position to intervene on behalf of the victims of the evolutionary process, even at their (the humans') own expense, in order that the logic of victimization should cease to have the last word, even within the ongoing processes of biological evolution.

Now it may well be objected that the types of victimhood that are relevant to a Girardian anthropology are quite different to those that pertain in the history of biological evolution: the former are (arguably) distortions of true humanity, whereas the latter (as Southgate unflinchingly emphasizes) are intrinsic to the evolutionary process. I accept that there is a genuine difference here. Nevertheless, I think Alison's approach may point the way to a particular theological way of reading Southgate's proposal. I suggest, in short, that if human relationships with non-human creatures fall short of the ideal for which creation is longing and groaning then this must ultimately be due to human idolatry. In other words, human complicity in the suffering of creation - to the extent that such complicity falls short of God's creative purposes - must derive from our worshipping gods other than the one creator of all things. Idolatry can only cease when the one to whom all knees bend (Philippians 2: 10) is the one true God, and this can only occur when the very quality of God has been instantiated within the created order as a sign of the way that God is (cf. Philippians 2: 6).[14] To say that every knee shall bend before such a sign is to say that this sign is to become the basis of the total orientation of our lives. I do not know exactly what such a reorientation of our lives ought to look like in respect of our relationship to non-human creatures, but Southgate's work surely represents one of the most constructive and nuanced proposals so far. My tentative suggestion is that a synthesis of a Girardian theory of atonement with the semiotic model of the Trinity might prove to be a fruitful framework within with to read such a proposal.

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[14] For the relation between the hymn in Philippians 2 and the Hebrew rite of atonement that is central to Alison's Girardian Christology see Broken Hearts and New Creations Chapter 13.

An important element in such an approach would surely be the recognition that when God-ness becomes embodied within the created order it becomes so as failure and as victim. As Alison emphasizes, the conclusion to be drawn from this is not principally that we should learn to value and live with the differences between ourselves and our out-groups; rather, we should recognize that we're all in the same boat - all subjecting ourselves to futility because of our orientation to things other than God.[15] If we were to apply this way of thinking to our relationship to the victims of the evolutionary process, perhaps the efforts to reduce rates of species extinction that Southgate urges would not be regarded - as might be tempting - as the benevolent actions of the legitimate victor of the evolutionary battle. Instead, and I'm sure this is more along the lines that Southgate envisages, it might be understood as a recognition that the current form of our species has been achieved at the expense of making others - including possibly other species of Homo - victims of the process. Furthermore, like all other terrestrial species - unless we find ourselves another planetary home before the sun becomes a red giant and engulfs the earth, or some other catastrophe overtakes us - we face inevitable extinction at some point in the future. We are ultimately in the same boat as all other creatures. It is because we, alone among creatures, have the capacity to recognize, interpret and respond to the sign of the quality of God's presence in the world that we have the potential collectively to embody that same quality - a potential which, if actualized, would be 'the revealing of the children of God' for which creation waits with eager longing (Romans 8: 19). Only then will creation be set free from its bondage to decay (v. 21). Presumably that does not mean that all death, or all extinction, will cease any time before the eschaton. What it means is that when the quality of God-ness becomes embodied and responded to in the world, then creatures may cease to be ultimately run by the fear of death and by futile efforts to avoid death by allowing others to become victims.

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[15] For example, Broken Hearts and New Creations, Chapter 3.

Creativity through Emergence: A Vision of Nature and God

Antje Jackelén

Introduction

Can emergence talk help us as we today are groping for new visions of nature that include the best of scientific and theological knowledge, that are attentive to the groaning of an environmentally stressed nature, and that can tell the story of becoming we see unfolding in nature? In this essay, I will explore a vision of nature as creation that arises from the concepts of complexity and emergence. The appealing plasticity of the concept of emergence has its counterpart in some obvious difficulties, such as the absence of clear definitions, the lack of the predictability of outcomes and the risk of conflating description and value judgments. In light of my discussion of the possibilities and pitfalls of emergence, I will nevertheless conclude that the concept of emergence, in its concrete as well as in its metaphorical sense, can contribute some specific suggestions as to how to speak well of nature, God, and ourselves. Such talk, in turn, is a prerequisite for responsible action.

The Emergence of Complexity: God or Nature?

How then does complexity emerge—is it nature that does it or is it divine creativity that does it? Framing the question this way implies an antagonism that on and off has kept many good minds busy. Yet, as I will argue by way of discussion of complexity and emergence, this opposition is quite unnecessary. The work of creativity may be adequately described in ways that are both immanent to nature and transcend nature. In fact, views that attribute creativity to both nature and divine energy can be traced back to the early centuries of the Common Era.

In the late fourth century, the church father Basil of Caesarea, one of the three Cappadocians, delivered a series of nine sermons on Genesis 1:1–25. In these homilies, known as the Hexaemeron, Basil included a lot of information about botany, zoology, geography, and astronomy, most of which reflects very well the level of scientific knowledge of his time.[1] With amazing ease, he moves between God and nature (physis) as actors in creation. It is nature that "encloses the costly pearl in the most insignificant animal, the oyster";[2] nature has placed the grain of the wheat "in a sheath so as not to be easily snatched by grain-picking birds";[3] nature has placed such powerful organs of voice in the lion "that frequently many animals that surpass him in swiftness are overcome by his mere roaring."[4] Animals follow "the law of nature strongly established and showing what must be done,"[5] and so do humans: We have got "natural reason which teaches us an attraction for the good and an aversion for the harmful . . . implanted in us,"[6] and we have "natural virtues toward which there is an attraction . . . from nature itself."[7] Teachings about social order are not introducing anything new, according to Basil; they are merely a continuation of natural order. When Paul gives directions regarding the relationship between parents and children, he recommends nothing new; he just "binds more tightly the bonds of nature."[8] In this regard, if he were alive today, Basil might even go so far as to actually agree with Barbara King's argument for the development of religious imagination from nature.[9] Nevertheless, there is a point where King and Basil would part company. For him, immanence alone will not do. In spite of the active causal role Basil attributes to nature and the law of nature, he has no problem whatsoever seeing God in the same things. Basil praises the sea urchin for its capacity of forecasting calm or rough waters by its behaviour. By this, Basil concludes, "the Lord of the Sea and the winds placed in the small animal a clear sign of [God's] own wisdom."[10] Hence: "There is nothing unpremeditated, nothing neglected by God. . . . [God] is present to all, providing means of preservation for each."[11] For Basil, God apparently acts "in, with and through" nature and there is no contradiction in that. What he observes is both natural and divine; it cannot be reduced to the dualism of either God or nature. Stated in more philosophical terms: God's creativity works in both immanent and transcendent ways.

According to Basil's view, processes of complexification can be as natural as they are divine and as divine as they are natural.

Complexity and Emergence: A Paradox Made Plausible?

It is a truism that the notion of complexity is far too complex to be caught in a simple definition.[12] Emergence is part and parcel of complexity: Complexity theory is "an incentive for an emergentist worldview."[13] As programmatic as this statement by physicist Paul Davies may sound, there are problems and risks with an emergentist worldview. A problem is that complexity and emergence are notions that at present nobody fully understands. Both concepts may be fairly well-defined in specific scientific and philosophical contexts, but as soon as they migrate into the realm of general understanding they become increasingly fuzzy.[14] Gregory Peterson addresses this problem by discussing the emergence of emergence and different kinds of emergence.[15] Exploring a concept that until now has escaped full understanding and daring to go so far as to build some concrete suggestions on it, as I do in this essay, has its risks and leaves the author vulnerable. Yet, this vulnerability is a necessary part of a vision: Only time will tell whether this is a vision or whether it was a delusion. I am convinced, however, that, at the very least, here is some valuable material for further re-envisioning the creative relationship of nature (including humans) and God.

Apart from many differences in definitions, it is a fundamental insight of complexity research that complexity is ontological; that is, it is inscribed in the order of being and is not a feature in the eye of the beholder. This means that, in spite of the elusiveness of its definition, there is something deeply objective about complexity. The fact that complexity research has strengthened the position of mathematical language, if at all possible, bears witness to this. The chaotic necessity that drives the idea of nature as emergent is firmly grounded in the language of mathematics.[15] Ultimately, complexity research is about the attempt to show that systems as disparate as sand piles and anthills, earthquakes, immune systems, economies, and ecosystems conform to

common mathematical principles. There is a growing view that complexity is evident at all scales. If that is right, then the assumption that macroscopic complexity is always the result of simplicity at the microscale is mistaken.

Complex systems are analyzed in terms of levels of complexity. In purely physical and philosophical terms, hierarchy seems to be the big gain of the deal. Precisely the idea that the whole order of being (and maybe even becoming) can be described in terms of a conclusive hierarchy of levels of complexity constitutes the core of the practical and aesthetic appeal of this concept.[17] In that, however, it runs counter to some recent developments in philosophy and theology that have pointed out that the concept of hierarchy is charged with so many problems that it needs to be abandoned or at least submitted to radical critique. Feminist and liberation theologians are not the only ones to have analyzed hierarchical thought structures that result in hierarchical social structures, which, in turn, produce oppression of human and nonhuman nature. Half a century ago, theologian Paul Tillich pointed to the problems inherent in hierarchical descriptions. Dismissing the concept of levels, he works with dimensions, realms, and degrees instead.[18] Whereas levels can hardly be imagined other than as ladder-type structures, dimensions, realms, and degrees allow for the conceptualization of more complex patterns of relationship. One dimension—here understood in the colloquial sense of "scope" or "aspect," rather than in its precise mathematical sense—can certainly govern and override the other in the same way as levels do. Yet, dimensions and realms can do more than that: They can succeed and precede each other, they can interact and be independent of each other, and they can overlap and complement each other. One can be superior to the other in some respects and inferior in others.[19] Such a concept oscillates between continuity and discontinuity and comprises both. It may even be more in line with how hierarchy is understood in ecology: Ecologists tend to recognize that any top-down influence that may be exerted in natural systems is not as absolute as often assumed in the philosophical and sociological use of the term hierarchy. The neatness of philosophical and physical hierarchies does not have a one-to-one correspondence with the levels of order we see in the world of living systems. Nature in that sense is messier than many of its descriptions.

Evidently, here lurks the risk of a disconnect between emergence as an abstract philosophical concept and emergence as the description of concrete natural processes.

Phrasing the problem as a question: Can emergence focus on dynamics and potentiality in such a way that the notion of levels is both validated and relativized? The answer seems to be yes, if one understands emergence as the coming into being of new modes and levels of (self-)organization and (co-)operation that transcend the limits of a system's inherent causality. In that sense, emergence transcends the rigidity of the physical origins of life, which, of course, implies neither the absence of causality nor an understanding of causal chains limited to compoundity or complicatedness. As Paul Davies has noted, "Complexity reaches a threshold at which the system is liberated from the structures of physics and chemistry while still remaining subject to their laws. Although the nature of this transition is elusive . . . , its implications . . . are obvious."[20] In this sense, complexity is something like a paradox made plausible! Radical indeterminacy is understood as a very natural transition. Emergence is radically surprising, yet not totally enigmatic.

Einstein, in his day, was very puzzled by the uncertainty implied in quantum physics. In fact, he found this indeterminacy repellent. Later interpretations have accepted this indeterminacy, however, and given it a positive spin, as it were, by understanding it as potentiality. Seen in this light, emergence can be interpreted as introducing—or better—accounting for, potentiality on every scale from the subatomic to the macroscopic. In my view, it is this particular feature that constitutes the radical character of emergence.

Culture and Nature: Abandoning Dualisms

Much of traditional reasoning about nature, including human nature, has been anthropocentric and individualistic. This perspective has been noticeably challenged by bio- and ecocentric models of thought. Anthropology in general, and the question of human uniqueness in particular, have gained new theological, philosophical, and scientific

actuality in many respects—genetics, primatology, evolutionary psychology/behavioural ecology, and artificial intelligence research being the most prominent on the scientific side. In this process, the chasm between nature and culture suggested by modernity has been unmasked as illusory, requiring new visions of connectedness, as James Proctor argues ("Environment After Nature: Time for a New Vision").[21]

Modern science has had a twofold input in framing the understanding of the relationship between nature and culture. On the one hand, it has strikingly contributed to the objectification of nature. The spirit of Baconian science offers graphic expressions in this regard. "The Beautiful Bosom of Nature will be Expos'd to our view: we shall enter into its Garden, and taste of its Fruits, and satisfy our selves with its plenty."[22] These are powerful metaphors that, as we know today, have deeply and often fatefully influenced modern views of nature and of human beings as "maîtres et possesseurs"[23] of this same nature. Metaphors and concepts like these have served to justify the domination, the exploitation, and the rape of nature.[24] Newtonian physics, with its concepts of absolute space and time, fostered an understanding of nature as the solid stage on which the drama of culture is performed. It seemed that nature is dominated by a cyclic order. Driven by repetitious cycles, nature forms merely the passive backdrop to the dynamic events in a culture that is developing linearly in history.

On the other hand, both Darwinian and Einsteinian science have contributed to the abandonment of this dualism. With the theory of evolution through natural selection, nature gained part in linearity and historicity. With the theories of relativity, the polarity between passive nature and active culture was rescinded. Nature is not an object in a huge container called absolute time, but time is in nature. History is not the account of a universe now moving inexorably and uniformly through time. It is the account of a space-time continuum of crisscrossing light cones curved around fields of gravity.[25]

When this problematisation of the subject-object relationship by nineteenth- and twentieth-century science is taken seriously, the way is open to think in terms of a differentiated relationality that blurs many clear-cut borders between nature and culture. Only a careless thinker will interpret this as a lowering of the standards of rationality and scientific accuracy. Accounting for complexity—that is, for processes of

becoming, multidimensionality, and relationality—clearly requires more than descriptions that limit themselves to states of being and one-dimensionality. It is precisely this development that has set the stage for much of the interest in understanding processes in terms of emergence. In its wake, a number of concepts crave clarification. Design and order are two of those.

Revisiting Design and Order

Theology has always depended on non-theological models of thought in order to frame its discourse about nature and God. For ages, Christian theologians have drawn on philosophers, especially Plato and Aristotle. When philosophy of nature turned into science, it was science that contributed to the shaping of theological thought about nature. Generally, the assumption was not that science would lend objective truth to theological statements. More often, scientific theories would provide inspiring metaphors for the articulation of a theological language that matches contemporary contexts. Both areas of knowledge have in various ways contributed to the shaping of worldviews throughout the centuries.[26] The following exploration of what it may mean to speak of nature as creation in light of emergence thought will serve as a current example of the interaction of theological thought with scientific concepts.

Within a framework based on the fundamental distinction between binaries, such as matter and form or matter and spirit, the doctrine of a creation out of nothing (creatio ex nihilo) makes a lot of sense. It safeguards the sovereignty of God by allowing for nothing beside God at the moment of creation. It also emphasizes the goodness of all creation: If everything comes from the word of a good Creator, nothing can fall outside, in the domain of a potentially evil force. But the doctrine also has its downsides. In the end, divine goodness tends to be overpowered by the idea of divine omnipotence. The doctrine also leaves Genesis 1:2—about the Earth being a formless void and God's spirit hovering over the face of the waters—without any intelligible interpretation.

Some theologians have pointed out that the notion of creation out of chaos is closer to the biblical sources than creation out of nothing. This, of course, does not decide the case, as the history of Christian thought knows of many doctrines that lack a clear scriptural foundation; but it provides, at least, motivations for considering alternatives. Mythically, chaos has tended to be understood as evil. Creation, then, is basically synonymous with the slaughter of the chaos beast. Theologian Catherine Keller identifies this understanding, which she calls tehomophobia (from the Greek phobos, meaning "fear," and the Hebrew tehom, meaning the "deep, the sea, or the chaos") as harmful.[27] The creative potential of the tehom fell victim to a tradition demonizing it as evil disobedience.[28] Order came to be understood as fully good and disorder as totally evil. By contrast, Keller points out that the biblical material also contains an often-neglected tehomophilic (from the Greek philia, meaning "friendship, love") strand, which is less interested in hegemonic and linear order and that interprets creation as cocreation.[29] Waters and the earth do their own creation (Genesis 1:20–24), and God takes delight in the play of Leviathan, the chaos monster (Psalm 104:26). The so-called wisdom literature, in particular, expresses views that are tehomophilic rather than tehomophobic and that are much less wedded to the dualism of order and disorder.

This observation calls for a radical change of perspective, from understanding chaos as enemy only to an understanding of chaos as potentiality. In light of this shift, Keller suggests that creatio ex nihilo be complemented by creatio ex profundis, out of the profundity and womb of God, which is understood as the multidimensional continuum of all relations.[30] Drying up the sea (tehom) of potentiality is fatal—as fatal as the emptying of the earth's aquifers. Christian repression of the transitional and wild is not only bad for the environment, as Keller opines;[31] it also eliminates the possibility of understanding complexity and emergence as significant features of the natural world, I would add. If this issue remains unsettled, we tend to build in yet another ostensible conflict between scientific and religious views of the world.

It can be argued on theological, philosophical, and scientific grounds that the dualism of matter and form, or order and disorder can no longer constitute a sufficient framework for understanding nature,

creation, and creativity. The door seems open for a liaison between emergence and tehomophilic understandings of creation and creativity. It must not be forgotten, though, that such understandings come at a cost. They give up something of the clarity of distinction between matter and form or spirit, good and evil, order and disorder. Creation is a risk for everybody involved, including God; its story needs to be read as a narrative of transformation and of metamorphosis, as philosopher John Caputo claims, and not as a neat onto-theological metaphysics.[32]

Keller is not the only theologian to choose messiness over clarity. Elizabeth Johnson has suggested that it was the fear of chaos that motivated an obsession with order in God, coming along with a support of hierarchical and oppressive structures.[33] Or in the words of Ruth Page: "The axiom of Christian faith that God is a God of order and not of disorder has meant in practice that disorder has been ignored, or, explained away, or written off as sin. . . . But that has left Christianity speechless in the face of much disorder . . . The emphasis on order has never reflected the dual experience of stability and change, the disequilibrium inherent in present order in open systems . . ."[34] A discourse obsessed with order has not been able to account adequately for development and creativity as they unfold in, with, and through the interrelatedness that marks nature and culture.

As the work of Keller, Johnson, and Page shows, theology has resources to develop other ways of talking about creation than to focus on design and order. Although the replacement of "God the designer" with God the "infinitely liberating source of new possibilities and new life,"[35] God as "serendipitous creativity,"[36] or God "the networker"[37] is not without problems, it is in accord with important elements of Christian theology, such as the concept of freedom, certain aspects of eschatology, the primacy of the possible before the real, and the notion of novelty.[38] It has the additional benefit of demonstrating that the question of "intelligent design" does not deserve the place in the limelight of religion and science that it so often assumes.

This reflection on design and order versus chaos and disorder suggests that there are good theological reasons to call into question some of the binaries and dualisms that have set the tone in much discourse for centuries. Moreover, it is striking how this theological development is paralleled by scientific and philosophical understandings

of emergence. With varying enthusiasm, scientists and philosophers interpret emergence as a way of letting go of binaries and transcending dualisms that seem to belong to a bygone era of intellectual history.[39] In this case, developments in theological thought are in consonance with sciences that describe the natural world by using the terminology of emergence and self-organization. If emergence and self-organization are true marks of nature, then tehomophilic strands do indeed provide a more comprehensive understanding of creation and creativity than tehomophobic ones.

Creation in Light of Emergence: Possibilities and Pitfalls

When Catherine Keller states that "the wounds inflicted by certainty . . . will be better healed by a discourse of uncertainty than by just another sure truth,"[40] this resonates perfectly well with the insight of one of the leading figures in complexity research. Contemplating the fact that we cannot even predict the motions of three coupled pendula, Stuart Kauffman exclaims: "Bacon, you were brilliant, but the world is more complex than your philosophy."[41]

Natural selection is not enough to account for the development from cell to organism to ecosystem, according to Kauffman's theory of complexity. Kauffmann claims the insufficiency of natural selection for diametrically opposite reasons than the intelligent design movement, though. In his work, the energy that drives creative processes is called "self-organization," instead of design. He concludes that we need both science and story to make sense of the universe.[42] Evolutionary theory must be rebuilt as "a marriage of two sources of order in biology—self-organization and selection,"[43] suggesting that science in general should be regarded in terms of an "intermarriage of law and history."[44] This, he muses, may be the starting point of a general biology that can formulate laws for all biospheres.[45] Kauffman is not alone: He draws heavily on Per Bak's concept of self-organized criticality as a general mechanism to generate complexity. The Brussels school, under Ilya Prigogine, would substantiate Kauffman's claim about history. We have reached a description of physics that brings a narrative element into play on all

levels, says Prigogine.[46] Systems biology provides yet another example; it takes on many of these insights and is currently gaining influence in both research and teaching.

Nevertheless, complexity theory and emergence are not undisputed. Critical issues can be raised in several respects. First of all, as already noted, there is a lack of clear definitions. The absence of consensus in this regard leads to a lack in clarity as to how to assess the potential of emergence. Second, the emphasis on the impossibility of predicting the development of complex systems is itself at odds with the traditional criteria for good science; namely, the ability to make testable predictions. Complexity theorists insist that at the poised stage between order and chaos, the unfolding consequences of the next step cannot be foretold. Will the next grain of sand falling on a sand pile evoke a trickle or a landslide? Nobody can tell. We can only be locally wise, not globally wise, as Kauffman puts it.[47] The theory of complexity is of necessity abstract and statistical;[48] furthermore, it appears to be insufficient.

Both Bak and Kauffman draw support from Stephen Jay Gould's theory of punctuated equilibrium and his emphasis on contingency in the evolutionary process. Other views, such as those embodied in Simon Conway Morris's convergence thesis, seem to accord less weight to the contingency of evolutionary processes.[49] This indicates a possible third difficulty: The conviction that large avalanches and not gradual change make the link between quantitative and qualitative behaviour and thus form the basis of emergent phenomena is central to complexity theory.[50] It seems, however, that the final word on whether evolution should be understood in terms of revolution, as Bak suggests,[51] has not yet been spoken.

A fourth critical issue pertains to the role of the "exactly right" level of criticality. The idea that supercritical, chaotic rules will wash out any complex phenomenon that might arise and that subcritical rules will freeze into boring, simple structures, while only the critical state will allow complexity, sounds plausible, if not seductive: Ecology must be posited precisely at the critical state separating the extremes, or rather at the phase transition between those extremes. The conclusion sounds appealing. "A frozen state cannot evolve. A chaotic state cannot remember the past. This leaves the critical state as the only

alternative."[52] However, caution may be called for. Cosmology provides an example of how fascination with just the right critical level (in this case, the exactly right level of matter density to slow down the expansion of the universe indefinitely) did not prove to be the right road to travel. The nonexpert craves an explanation that clarifies the distinction between the desire to detect teleology and the state of facts in this regard. The window of possibility for viable structures may be much wider than the fascination with the edge of chaos suggests.

A fifth issue is, in my opinion, the most problematic one; namely, the conflation of description and implicit value judgments, which seems to come very easily with emergence, as also pointed out by Willem B. Drees. Careful and critical interpretation is called for, especially when emergence is used in order to justify social norms based on what is perceived as a universal, natural, and hierarchical order. In one breath, the editorial description of a recent book states that the emergence of new order and structure in nature and society is explained by physical, chemical, biological, social, and economic self-organization, according to the laws of nonlinear dynamics.[54] The scope of this list is quite breathtaking. The author of the book, philosopher of science Klaus Mainzer, suggests that symmetry and complexity are not only useful models of science, but that they are universals of reality: "In the beginning there was a dynamical symmetry expanding to the complex diversity of broken symmetries,"[55] which leads to the emergence of new phenomena on all levels from atoms to art. On the basis of his understanding of phase transitions, Mainzer argues that, in order to meet the challenges of globalization, "We should deregulate and support self-regulating autonomy," because "The sociodiversity of people is the human capital for a sustainable progress . . . in the evolutionary process of globalization."[56] Mainzer derives social and political norms directly from the scientific and philosophical study of emergence. A leap of such dimensions requires a careful and critical analysis; this need must not be hidden under the cover of emergence as an all-embracing theory.

In light of these five issues, what is the theological relevance of emergence? Where is its place in theological reasoning? Does emergence argue for the existence of God? The answer is no. Even though Kauffman expresses the hope that the new science of complexity may help us to recover our sense of the sacred,[57] it is as feeble a proof of

the existence of God as Thomas Aquinas's five ways that build on the principle of simplicity rather than complexity. The laws of complexity do not allow for a deus ex machina; they build solely on dynamic interactions among elements of a system—the principle called self-organization. No intervention from outside is needed. Complexity requires long processes of evolution, but it "can and will emerge 'for free' without any watchmaker tuning the world."[58]

Neither can emergence be claimed as a proof for the failure of materialistic accounts. Quite the contrary, the concept of emergence has gained considerable appeal just because it seems to underwrite a materialistic worldview.[59] The least to be said is that there is ample wiggle room for interpretation here. For example, both Ursula Good enough and Terrence Deacon on the one hand, and Philip Clayton on the other, argue for strong forms of emergence. Yet, there is a fundamental difference between their proposals. Good enough and Deacon use emergence in order to argue that everything is perfectly intelligible within a naturalist framework, thus making any theist notion superfluous.[60] Religious feelings like awe can be fully accounted for within the realm of the natural. They are not dependent on a God-relationship; hence the possibility of a nontheistic religious naturalism. According to this view, nature is enough. Philip Clayton, on the contrary, uses emergence precisely to break open such a naturalist system by exploring how emergence may suggest transcendence. In his proposal, nature is not self-enclosed but, in principle, is upwardly open to divine influence on various parts of the natural world.[61] According to him, nature is not enough.

The conclusion following from this theological twilight is that a hermeneutical approach of methodological naturalism fits this area of science as well as any other. The theological relevance of emergence is not to be sought in the historical area of proofs for the existence of God. It is not in the field of apologetics. Rather, theological reflection on emergence has a heuristic function. It encourages a fresh look at old things by discussing the ways in which emergence thought can help to respond to the call for visions of nature that fulfil the criteria stated at the beginning of this essay: visions that include the best of scientific and theological knowledge, that are mindful of the groaning of an

environmentally stressed nature, and that can tell the story of becoming that we see unfolding in nature.

As already mentioned, there are exciting parallels with regard to understanding how nature works and how we speak about nature as creation. There are points of contact between Keller's talk of creation as co-creation and Kauffman's and Bak's terminology of coconstruction[62] and coevolution of interacting species,[63] that is, the coordinated evolution of entire ecosystems.[64] Emergence theorists talk about interacting dancing fitness landscapes and life as a global, collective, cooperative phenomenon. There is a direct affinity between such talk and the language of much of recent theology that often favours metaphors of dance and concepts of relationality.[65]

My appraisal of creation out of nothing in light of emergence differs from the critique of process theologians who tend to see creatio ex nihilo as the most disastrous distortion of Christian faith.[66] Instead, I argue for maintaining the concept for both its anti-Manichaean merits and its affirmation that everything created has an implicit God-relationship. However, I also argue that the ex nihilo needs to be released from its metaphysical restriction to the dualism of form and matter so that it can be used as a lens for a theological understanding of processes of emergence. As cosmology insists, nothing is not nothing (at least with regard to quantum fluctuations): The metaphysical short-circuiting of the nihilo can be overcome on rational grounds. Creation understood as the emergence of "something more from nothing but"[67] can be a legitimate interpretation of creation out of nothing. Such a reading comes with the additional benefit of lessening the gap between creatio originalis (original creation) and creatio continua (continuous creation).

In sum, I agree with Peterson[68] that emergence entails a critique of claims of completeness and closure. I am careful, however, to distinguish these claims from attempts of sneaking in a variation of a god-of-the-gaps argument and to avoid an overemphasis on the hierarchical levels of emergence. The latter neglects horizontal relationships at the expense of vertical ones and has a propensity to conflate description and values. Both these risks appear to be more imminent, when emergence thought is based predominantly on physics

and philosophy. Essays by Henderson, Proctor, and Ulanowicz lead me to the conclusion that the ecological scale seems to be the most appropriate one with which to gain an understanding of the scope of interrelatedness that is the hotbed of emergence. At the ecological scale, it seems easier to avoid the tyranny of the ladder metaphor that often comes with emergence talk, because ecology has a tendency to relativize distinctions between higher and lower levels. The ecological scale may also help to address the intricate relationships between facts and values, because ecology always needs to ask the question: What is a value for whom?

As I now move on to sketch out some specific elements of a vision of human and nonhuman nature and God, I deliberately enter the grey area between a concrete and metaphorical use of emergence—a methodological move that in itself may count as emergent.

Elements of a New Vision in Light of Emergence

In my view, the following elements are conducive to an appropriate vision of nature in light of emergence—a vision that is informed by both science and a theologically reflected understanding of nature and God. I will sketch these elements as brief responses to six questions. Rather than providing definitive answers, these short statements are meant to provide material for further reflection.

How can we talk about nature?

In light of emergence, nature presents itself as shaped by two seemingly opposing tendencies. On the one hand, it is marked by an openness that facilitates evolution and complexification; on the other hand, it bears the mark of a restraint that imposes order. Consequently, we see a powerful inherent creativity in nature, provided by the laws of nature. Again, we see the paradox made plausible—yet not domesticated. This vision of nature suggests that the opposing tendencies are linked together; openness and restraint are one in nature.[69] Theologically speaking, this would mean that Manichaeism has rightly been debunked as wrong teaching. Concepts that work with the unity of the hidden and revealed

God are better suited to express this vision. Nature is not a chain of sand grains or beings trickling from the hand of a supposedly almighty creator. It is better understood as the story of becoming and complexification. The mix of catastrophism and creativity has its correspondence in a creator who is present both immanently and transcendently and for whom creation also is a process of kenosis (Greek for "emptying") and vulnerability. Creation is a "dicey business" for everybody, including God.[70]

Concepts of complexity count on a phase space of potentiality linked to natural phenomena. This is an image for the idea that every event is "surrounded by a ghostly halo of nearby events that didn't happen, but could have."[71] In terms of theological analogy, this could mean that a field of transcendence is coupled with factual reality. The "adjacent possible"[72] has a role in processes of actualization; it can, in fact, be seen as a part of actuality. It is in this sense that I think Paul Tillich understood the eschaton ("the last, the ultimate"), when he spoke of the eschaton as the "transcendent meaning of events."[73]This concept of a space of potentiality implies a beneficial disruption of simple notions of intervention. It entrusts to the rubbish heap of history the equation that identifies any divine action with a violation of the laws of nature. Searches for expanded concepts of causation are well justified and called for.[74]

How can we talk about human nature?

The concept of emergence is potentially helpful in addressing the question of human nature, and specifically the question of human uniqueness within a vision of nature that emphasizes the continuity between nature and culture. Traditional theological understandings of human uniqueness (imago dei) have often focused on cognitive traits, like human rationality and intelligence that have set humans apart from the rest of nature. On the contrary, an understanding of human uniqueness in terms of emergence, such as that suggested by Wentzel van Huyssteen, emphasizes both continuity and discontinuity with the rest of nature: It accounts for our close ties with the animal world as well as for the uniqueness in which symbolic and cognitively fluent minds bring about language, art, technology, religion, and science.[75] It is a prerequisite for a comprehensive vision of nature to understand

humans as the part of nature they are, while at the same time articulating the specifics of human potential and responsibility.

How can we speak about God?

God is not the designer of outcomes; rather, God is the wellspring of the frameworks within which complexification can occur. The watchmaker image of God has given way to a networker image of God.[76] This is the definite end of any deistic concept of a God who winds up a cosmic clock and then retires to watch the process of mechanical unwinding. In this vision, God is the transcendent creator as well as the immanent creative energy. This concept acknowledges both creatio originalis and creatio continua. The idea that God has created the world as self-productive or self-organizing seems to offer a possibility of modifying concepts of God as a designer, so that they include evolutionary concepts, allowing for freedom and genuine novelty. God as the wellspring of complex autopoietic systems is Godself living a complex life, implying change, having freedom, and granting freedom. In light of this, problematic divine attributes, such as immutability and impassibility, can be revisited in a substantive way. Grace and freedom can be conceptualized without ruling out the notion of God's transformative power.

How can we speak about natural evil?

Theories of complexity are relevant to the question of natural evil. Why do earthquakes happen if creation is meant to be good? As Bak remarks, self-organized criticality (the state of maximum slope in the sand pile) can be conceived of as the theoretical underpinning for catastrophism, that is, the opposite philosophy to gradualism.[77] It implies that catastrophes happen and need to happen, and that they happen as a consequence of very small events. This thought has its theological counterpart in apocalypticism, which tends not to be a favourite subject of theologians. Often, its well-behaved cousin, eschatology, has been tremendously more popular than this unruly enfant terrible. Yet, as Keller rightly points out, from an ecotheological perspective, an antiapocalyptic stance that joins the tehomophobic strand and metaphorically and literally empties the dark sea (and thus creativity), as

tempting as it may seem, colludes with a conservative triumphalism so often detrimental to the environment.[78]

Along these lines, the concept of emergence adds sophistication to one of the traditional ways of engagement with the unsolved problem of theodicy. It supports the pedagogical approach by suggesting that nature works so that there is a price to be paid for complexification, because conplexification needs both order and disorder. Nature displays criticality and catastrophes as well as creativity and stability. This does not diminish the role of pain and evil in the world, and does not explain the magnitude of evil. Even pain that is understood within a framework of emergence is no less painful, but not being able to feel and articulate pain would be an even greater evil. This is why lament is a vital element of religious practice.

What can emergence contribute to an understanding of sacramentality?

The concept of emergence has a theological parallel in the concept of sacramentality. Both emergence and sacramentality can be understood as having the capacity of expressing the continuity between the physical, mental, and spiritual in terms of a differentiated relationality. Both express the fact that the less complex can birth the more complex. Bread and wine emerge into shared communion with Christ; out of water and word emerges a new life in Christ.

Properly understood, sacramentality is the radicalization of the idea that a phenomenon is more than it presents itself to be. It goes at least one step further than the emergentist understanding referred to with regard to human uniqueness and its emphasis on continuity and discontinuity with the rest of nature. It also moves beyond a general acknowledgment of the significance of potentiality. Rather than focusing exclusively on the actual, emergence encourages a view of reality as a blend of the actual and the potential. Sacramentality radicalizes this by declaring the potential to be part of the actual: For the human eye and tongue, bread is bread, and wine is wine; a sacramental view claims that the reality of communion in Christ surpasses the apparent actuality by turning that which according to human perspective is (merely) potentiality into reality. Bringing emergence thought together with the theology of the sacraments seems fruitful both for

Western theology as well as the theology of the Eastern churches and their understanding of sacramentality and divine energies.

It is here, in the context of sacramentality, that I stretch the use of emergence toward a metaphorical maximum. The following statement about theological method reverts to a more concrete understanding of emergence.

What bearing does a heuristic understanding of emergence have on theological method in general?

Emergence presupposes the existence of clusters of networks. A word of caution may be in order, though. The human mind with its seemingly insatiable desire to recognize patterns has a tendency to imagine networks and clusters of networks as a state of order. However, radical interconnectedness implies much more disorder than a sanitized concept like clusters of networks suggests—especially to the layperson. Mathematically, one can clearly distinguish the ordered structure from the disordered—and both are there![79] Bringing emergence and theology together may therefore in praxis be much riskier than the theory would indicate.

One of the less dramatic implications of viewing the practice of theology in light of emergence is the requirement that theology as a discipline needs to increase its attention to communal, ecumenical, and interfaith approaches. Developments in the religious landscape cannot be understood adequately by focusing on the religious experience of single individuals or the content of one specific religious tradition or geographic region alone. One has to take into account relations with the rest of nature, as well as a full societal scope. Global wisdom cannot be attained. Yet local wisdom cannot be attained without seeking global wisdom.

Conclusion

Many current intellectual pursuits across varied disciplines tend to be driven by the will to understand nature, science, and religion in terms of

dynamic systems, interrelatedness, discontinuities, and processes of complexification. In this situation, emergence serves as a fruitful concept that seems applicable over the entire spectrum of knowledge. Emergence is not easily defined, however, and its concomitant interpretations can be as flawed as any. In the scientific realm, ecology appears to be especially well-suited to enhance the understanding of emergence by describing the interplay of opposing tendencies in nature and the variety of interactions across levels and networks.

In philosophy and theology, emergence contributes to the critique of ontological metaphysical statements. Narrative understanding is always necessary: Metaphysics cannot do without myth. Even here, opposing tendencies and binaries are seen in a perspective that is different from what usually goes by the name of Cartesian dualism. Reconsidering the role of the potential and the real allows for an understanding of binaries, such as immanent/transcendent, order/disorder, and nature/culture along the lines of what I have called a differentiated relationality. This, in turn, invites us to envision nature, God, evil, sacramentality, and theological method in the directions shown in this essay.

Notes

[1] Except for geography, where Basil seems to be behind the standards of his own time. Saint Basil. Exegetic Homilies. Translated by Sister Agnes Clare Way, C.D.P., Washington, D.C.: The Catholic University of America Press, 1963. x.
[2] Ibid,, VII 6, p. 115.
[3] Ibid., V 3, p. 71.
[4] Ibid., IX 3, p. 139.
[5] Ibid., VII 4, p. 112.
[6] Ibid., VII 5, p. 113.
[7] Ibid., IX 3, p. 141.
[8] Ibid., IX 3, p. 141.
[9] Barbara King, “God from nature: Evolution or Emergence?”
[10] Saint Basil, VII 5, p. 114.
[11] Ibid., VII 5, p. 114.
[12] According to Danish theologian Niels Henrik Gregersen, for example, complex systems come in seven varieties; they can be descriptively, constitutionally, organizationally, causally, functionally, algorithmically and effectively complex. Niels Henrik Gregersen. Complexity: What is at Stake for Religious Reflection?

In: Kees van Kooten Niekerk and Hans Buhl (eds.) 2004. The Significance of Complexity. Aldershot: Ashgate. 135-65, here 136-41.

[13] Paul Davies. "Introduction: Toward an Emergentist Worldview." In: Niels Henrik Gregersen (ed.) 2003. From Complexity to Life. On the Emergence of Life and Meaning. Oxford: Oxford University Press. 13.

[14] On the migration of concepts and its hermeneutical implications see Jackelén 2004.

[15] Gregory Peterson, "Who Needs Emergence?"

[16] Douglas E. Norton, "Visions of Nature through Mathematical Lenses".

[17] See e.g. Philip Clayton. Mind and Emergence, and my discussion of emergence and hierarchy in Antje Jackelén, Emergence Everywhere?!

[18] Paul Tillich. 1963. Systematic Theology, vol. III. Chicago: Chicago University Press. 15ff.

[19] Cf. Robert Ulanowicz. 2001. "The Organic in Ecology." Ludus Vitalis 9[15]:183-204, who argues that higher order composite systems, like ecosystems and socio-economic systems are generally both simpler and longer-lived than their components.

[20] Paul Davies, Introduction: Toward an Emergentist Worldview, 8.

[21] James Proctor, "Environment after Nature: Time for a New Vision".

[22] Thomas Sprat. History of the Royal Society. Edited by Jackson I. Cope and Harold Whitmore Jones (St. Louis: Washington University Press, 1958), 327. [Spelling adapted by the author].

[23] "Masters and possessors". René Descartes. 1979. Discours de la méthode. Introduction and note E. Gilson. Paris: Librairie Philosophique J. Vrin. 128. #

[24] Carolyn Merchant. 1989. The Death of Nature. Women, Ecology and the Scientific Revolution, San Francisco: Harper & Row.

[25] Cf. Antje Jackelén, Time and Eternity, 121-181.

[26] See the essays by John Hedley Brooke, David N. Livingstone, Nicolaas A. Rupke and J.M.M.H. Thijssen.

[27] Cf. the Babylonian Tiamat, which can be translated as watery chaos.

[28] Catherine Keller. "No More Sea: The Lost Chaos of the Eschaton." In: Dieter T. Hessel and Rosemary Radford Ruether (eds.). 2000. Christianity and Ecology: Seeking the Well-Being of Earth and Humans. Cambridge MA: Harvard University Press. 183-98, here 183.

[29] Catherine Keller. 2005. God and Power. Counter-Apocalyptic Journeys. Minneapolis: Fortress Press. 137-145.

[30] Ibid., 146f.

[31] Keller. No More Sea. 196.

[32] John D. Caputo. The Weakness of God. A Theology of the Event. Bloomington & Indianapolis: Indiana University Press, 2006. 55-83.

[33] Elizabeth Johnson. 1994. She Who Is: The Mystery of God in Feminist Theological Discourse. New York: Crossroad. 196f.

[34] Ruth Page. 1996. God and the Web of Creation. London: SCM Press. 37.

[35] John F. Haught. 2000. God after Darwin: A Theology of Evolution. Boulder, Colo.: Westview Press. 120.
[36] Gordon D. Kaufman. 2004. In the beginning … Creativity. Minneapolis: Fortress Press.
[37] Niels Henrik Gregersen. Complexity: What is at Stake for Religious Reflection? In: Kees van Kooten Nierkerk and Hans Buhl (eds.) 2004. The Significance of Complexity. Aldershot: Ashgate, 156.
[38] On the priority of the possible over the actual see e.g. Eberhard Jüngel, God as the Mystery of the World, 216f. On eschatology and novelty, see Jackelén, Time and Eternity, 93-97, 208-214.
[39] Cf. Proctor op. cit., and Peterson op. cit.
[40] Keller, God and Power, 150.
[41] Stuart Kauffman. 1995. At Home in the Universe: The Search for Laws of Self-Organization and Complexity. Oxford: Oxford University Press. 303.
[42] Kauffman. 2000. Investigations. Oxford: Oxford University Press. 119.
[43] Ibid., xi.
[44] Ibid., 267.
[45] Ibid., 157.
[46] Ilya Prigogine. "Zeit, Chaos und Naturgesetze." In: A. Gimmler, M. Sandbothe and W. Ch. Zimmerli (eds.) 1997. Die Wiederentdeckung der Zeit. Darmstadt: Wissenschaftliche Buchgesellschaft. 91.
[47] Kauffman. At Home in the Universe. 29.
[48] Bak. How Nature Works, 9-10.
[49] Simon Conway Morris. 1998. The Crucible of Creation: The Burgess Shale and the Rise of Animals. Oxford: Oxford University Press. (Convergence means that similar trends are found repeatedly in evolutionary history. The role of contingency would then be less significant than claimed by Gould.)
[50] Cf. Bak. 32.
[51] Bak, 60.
[52] Bak, 127.
[53] Drees in this volume [9].
[54] Mainzer 2005 Symmetry and Complexity: The Spirit and Beauty of Nonlinear Science.
[55] Ibid., 22.
[56] Ibid., 272.
[57] Kauffman. At Home in the Universe. 4-5.
[58] Bak, 48.
[59] For example on the shape of the "culturological" approach in Leslie A. White. 1949. The Science of Culture: A Study of Man and Civilization. New York: Farrar, Straus and Cudahy.
[60] Goodenough, Ursula and Terrence W. Deacon. 2003. "From Biology to Consciousness to Morality." Zygon 38 (December): 801-19. Goodenough, Ursula.

2005. "Reductionism and Holism, Chance and Selection, Mechanism and Mind." Zygon 40 (June): 369-80.

[61] Clayton, Philip. 2004. Mind and Emergence: From Quantum to Consciousness. Oxford: Oxford University Press, 156-213, esp.193.

[62] See e.g. chapter 8 in Investigations on "Candidate Laws for the Coconstruction of a Biosphere" and chapter 10 "A Coconstructing Cosmos?"

[63] E.g. Bak, 122.

[64] Cf. Robert E. Ulanowicz. 1997. Ecology, the Ascendent Perspective. New York: Columbia University Press.

[65] The interpretation of 'dance' may differ between biology and theology, though. In biology, it is close to being a euphemism for the struggle for survival, whereas in theology it tends to have aesthetic and liturgical connotations.

[66] Cf. David Ray Griffin. 2004. Two Great Truths: A New Synthesis of Scientific Naturalism and Christian Faith. Louisville, London: Westminster John Knox Press.

[67] Ursula Goodenough and Terence Deacon 2003. "From Biology to Consciousness to Morality." Zygon 38 (4): 801-19, here 802.

[68] Peterson op.cit.

[69] Robert E. Ulanowicz speaks of a "two-tendency universe" in 1997. Ecology, the Ascendent Perspective. New York: Columbia University Press. 93-95. He discusses the significance of two opposing trends in ecosystem development in his Process Ecology: A Transactional Worldview.

[70] Caputo, The Weakness of God, 64.

[71] Van Huyssteen, Evolution and Human Uniqueness. 199 (drawing on the phase space concept as developed by Ian Stewart in his Life's Other Secret: The New Mathematics of the Living World, London: Penguin, 1998).

[72] I have borrowed this term from Kauffman's Investigations without necessarily following his definition.

[73] Paul Tillich. 1963. "Eschatologie und Geschichte." In: Der Widerstreit von Raum und Zeit. Schriften zur Geschichtsphilosophie, Gesammelte Werke, edited by R. Albrecht. Stuttgart: Evangelisches Verlagswerk, 6:72-82, here 77. ["jedes beliebig kleine oder beliebig grosse Geschehen nimmt Teil am Eschaton, am transzendenten Geschehenssinn"].

[74] Cf. Philip Clayton. 2004. Natural Law and Divine Causation: The Search for an Expanded Theory of Causation. Zygon 39: 615-636. See also Niels Henrik Gregersen. 1998. "The Idea of Creation and the Theory of Autopoietic Processes." Zygon 33(3): 333-367#. Gregersen suggests a distinction between structuring and triggering causes to the understanding of complexity and emergence. While a triggering cause always has a direct relation to an effect, a structuring cause has no one-to-one relationship to a particular effect.

[75] Wentzel J. van Huyssteen. "Evolution and Human Uniqueness: A Theological Perspective on the Emergence of Human Complexity." In: Kees van Kooten

Nierkerk and Hans Buhl (eds.) 2004. The Significance of Complexity. Aldershot: Ashgate. 195-215, here 211-12. See also Idem, Alone in the World?

[76] As pointed out, for example, in Gregersen's writings on the subject, e.g. in Complexity: What is at Stake for Religious Reflection? In: Kees van Kooten Nierkerk and Hans Buhl (eds.) 2004. The Significance of Complexity. Aldershot: Ashgate, 156.

[77] Bak, 131.

[78] Keller. No More Sea, 185.

[79] Cf. Robert E. Ulanowicz, Ecology, the Ascendent Perspective, 77-80.

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Theology after Darwin – and Beyond

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Abstract

Darwinian ideas have influenced many disciplines; it would be naive to deny the impact they had and still have within the field of theology. The present paper assesses this impact by considering both negative and positive influences, because often, challenges become opportunities. Furthermore, contemporary evolutionary biology has evolved in a way that provides a more pluralistic panorama, helping to reframe some of the old questions and challenges.

Keywords: Darwin, Evolution, Anthropology, Religion, Christian Theology, Pluralism, Reductionism.

Introduction

Religious people used to feel rather scared when the name of Darwin was mentioned. It evokes a very different universe from the one we used to learn in the Biblical tradition; a diminishing image of humans, too much in line with the apes, and a world where God seems to fade away, as science can explain everything without resorting to divine intervention. Theology may share a similar mood, even if most of theologians tend to care little if at all about Darwin and evolutionary biology. Indeed some contemporary theologians take the "indifference" stance towards scientific developments; a position of incommensurability unassailable to any rational criticism.

Other theologians believe that Darwin's theory of evolution is profoundly relevant for theology and for Christian living. This is especially true for theological programs which remain open to science

and culture. A different form of religious reflection arises when it is not afraid of engaging with the best contributions of art, culture, philosophy, and science, but rather appreciates all that is positively human and learns from these disciplines to live a more mature and fruitful faith. Some theologians argue that religious faith can gain more than it loses when it takes science and other forms of human reason or creativity into consideration, in particular those issues that are most challenging for religious faith.

Many agree that Charles Darwin's understanding of the process of evolution through natural selection constitutes a milestone within science. His thinking reaches far beyond the realm of palaeontology and broad biology. He created a unique model of thought that helps to infuse dynamism into the way we view the living world, including its social and human dimensions. His theory means that everything is exposed to change, which implies that no one can predict with certainty what will last or become extinct. Nothing can be taken for granted, because the evolutionary process only ensures relative rates of success. Furthermore, those "victories" can never be seen as complete, however significant they may be, because the evolutionary triumph of today could mean the total extinction of entire species tomorrow.

Theology and Christian thought should not ignore the consequences of Darwinism for understanding nature and the human condition. Especially because it inevitably touches on the meaning of faith, religious behaviour, and our understanding of what is divine. Simply put, since we currently live within a "Darwinian world," and have come to inhabit a "Darwinian mind," it is considerably more fruitful to study the Darwinian understanding of the world and its implications than to ignore its impact and avoid its challenges.

The present paper is an attempt to analyse the impact of a Darwinian understanding of the world on Christian theology. Furthermore, its attempt is to evaluate the levels of reception of Darwinism within the theological milieu. The aim is also to investigate the new insights that are developed from a dynamic process of research, discussion, and theory building. It will be shown that Darwinian thought brings both risks and opportunities for theological reflection. In order to do so, the main challenges of Darwinism will be described, some of which are not solely challenges to religious faith, but also to philosophy

and ethics. Furthermore, it will be shown how evolutionary theory may help theology and even solve intractable old questions. Moreover, it will be disclosed how contemporary theology is affected by this theory and is called to change its mind and method. In the last paragraph, *moving beyond Darwin*, it is argued that the several lines of thinking around the theory of evolution should allow for a more diversified theological response.

Challenges of Evolutionism for Christian Theology

Three main challenges which need to be assumed when theology tries to seriously engage with Darwin's legacy:

1. How much the theory of "natural selection" renders redundant the role so far played by God as agent of creation and conservation or improvement of the natural realm (Dupré 2003)?
2. Whether that same theory, in some analyses implies nihilism in the extreme (Sommers and Rosenberg 2003). This challenge affects not only theology, but the field of ethics as well.
3. How far the theological representation of human nature becomes affected by the view that human beings are no longer created in the image of the God of love, but are similar to other animals striving for survival and reproduction.

The first challenge has been described – among others – by John Dupré. This American philosopher states that "Darwin's theory provides the last major piece in the articulation of a fully naturalistic world-view and hence would, if fully appreciated, deliver a death blow to pre-scientific, theocentric cosmologies" (Dupré 2003, 41). He is convinced, against the attempts to reconcile evolution and theology by Ruse, Gould, and many others, that "Darwinism undermines the only remotely plausible reason for believing in God, [namely the argument from design]" (Dupré 2003, 56).

Maybe Dupré is just rendering explicit what was affecting, for a long time and in a latent or implicit way, the set of convictions or basic

ideas of religious faith. Indeed faith in a provident and loving God could be justified in part, because of an incomplete knowledge of reality. Since ancient times, the apparent order of nature, the cosmic harmony, and the wonders of biological self-organization demanded explanations. For a long time, the idea of a divine agent provided the best cognitive model in order to build a coherent and complete representation of natural reality as well as to fill the gaps of unexplained causes and events. This view seems to have become no longer necessary, as nature may be rationally explained, i.e. without resorting to a divine agent able to bear order in the midst of chaos. God becomes "redundant," or a hypothesis that does not add anything new or that does not improve the scientifically available model. One consequence is that people who based their religious faith upon that cognitive model, perhaps felt less motivated to continue the religious path. This is another version of the well-known Weberian analysis of the causes of the modern secularization process: modern times provide a more rational view of everything, and, as a consequence, religious beliefs appear as ever less rational and fitting in the new intellectual framework (Weber [1919] 1988, 598).

Strategies to cope with the question of God's redundancy

Theology is currently trying several strategies to cope with the challenge that could be called "the question of God's redundancy." Three such strategies can succinctly be described.

1. A strategy to overcome a "God of the gaps" mentality;
2. Embracing a mystical approach to "the God of evolution";
3. Taking a new apologetic stance showing the radical limits of the scientific view.

The first as well as the second strategy follows a traditional pattern that could be described – in Catholic Jesuit terms – as "making a virtue of a defect": What apparently appears as a hindrance for faith, when observed from a different point of view may become an advantage.

The first strategy tries to overcome a religious concept that is almost completely based on the defects of reality. Such religion constitutes a kind of "negative faith," a kind of religious instrumentalism. God becomes the "problem-solving" entity thereby taking away our concerns. A more mature religiosity would rather appreciate God not so much as the answer to what we lack, but rather as the Giver of what we already have and continually receive.

The second strategy builds on the insight of an apparently redundant God in order to constitute "theistic evolutionism". This line of thinking has been endorsed by several theologians, from Teilhard de Chardin to John Haught. All emphasize the loving creative power of God, revealed through the evolutionary process. Evolution then is perceived not just as a spontaneous unfolding of natural processes, but rather as a wise and mysterious course, full of beauty and inspiring awe. Perhaps Michael Dowd's book *Thank God for Evolution* (2007) may be considered a successful attempt to render a "mystical view" of the evolutionary process popular. His aim is to invite the believers to appreciate the creative power revealed in the uninterrupted succession of new cosmic and living forms. In other words, what for atheists and agnostics, appears as a reason for avoiding religious faith becomes, for the believers, a reason to deepen their spiritual commitment, as they discover new ways to appreciate the immensely creative power of God, revealed in this awe-filled evolving world of infinite richness. As has often happened in modern times, new discoveries may give rise to deep ambiguity nourishing both scepticism and faith, religious disregard and deep devotion.

The most severe criticism of these theological and spiritual approaches is that theology is not fair in dealing with science. In other words, these theological manoeuvres are seen as futile attempts to inject alien ideas into the Christian tradition in order to build a more science-friendly version. Christian thought has throughout its secular history repeatedly shown its ability to integrate or assimilate conflicting theories and views. Indeed, several atheistic ideas have been reconverted or recycled into the Christian toolkit. For example, the attempts to "Christianize" Marx and Freud. So, why not also include Darwin and the theory of evolution? However, there is a difference worth considering. By including Darwinism, theologians do not have to deal with specific

philosophies or ideologies, which may or may not be accepted, but with "scientific evidence", which has a different meaning.

In any case, it seems difficult to contest that many theologians have revised their theology in a way that God and evolution become not only compatible, but even *complementary*. Furthermore, there is no doubt that many believers have managed to integrate both views in their lives. This clearly challenges those who claim that only creationism fits into the Christian doctrine as well as those who argue that the theory of evolution renders religious faith insignificant.

The theological adoption of evolutionism into a Christian or other religious framework entails some gain or added value, because the divine is introduced into the apparently spontaneous process. Evolution becomes, in that way, a deeply meaningful course, because including the divine increases the plausibility of evolutionism while adding purpose and hope to the process of evolution.

An example of this strategy is offered by John Haught. The evolutionary view is more in line with a theology of future and promise, and overcomes the "metaphysics of the past," or total determinism (Haught 2000). According to Haught, evolution is rather an open process, in which divine freedom interacts with an indeterministic world in a creative way. Essential in Haught's idea is that by including the divine into the process of evolution, this process is no longer random but has a purpose. Plain evolutionism, on the other hand, may provoke nihilism.

Nevertheless, Haught's position is not left without criticism. In the well-aimed words of Barbara Herrnstein Smith: "The New Natural Theology is largely a rhetorical enterprise, a matter of making a series of complex, somewhat paradoxical ideas credible through a skilful use of language" (Smith 2009, 97).

Perhaps a stronger strategy is required in order to deal with the criticism expressed by Dupré and many others and in order to move beyond rhetorical constructions. The theory of evolution is a scientific theory with broader implications. It explains the unfolding of life in its multiple successive forms. It is a well proven scientific theory with high levels of heuristic power. Nevertheless, it does not provide a complete view of the world, human beings, or every aspect of a complex human life. Due to the criteria for doing science (simplicity, repeatability and testability) science cannot be complete in its explanations of reality.

Scientists deal with specific aspects of reality, i.e. those aspects that are measurable and observable. Therefore, many aspects of social and human life lie beyond the possibility of scientific investigation. The current means scientists have at their disposal makes it impossible for them to deal with other dimensions of human life, e.g. love, friendship, morality, suffering or meaninglessness.

Also from an empirical point of view, it becomes obvious that the advances of scientific knowledge as well as the increase of scholarship amongst the average population have not made contemporary generations happier or more satisfied. It is sufficient to look at several indicators, such as for example family stability, mental health, social unrest, and educational struggles.

To conclude what is said above, scientific evolutionism does not render religious faith redundant, as, by the same token, it does not render art, friendship, or morality redundant.

Because of the ethical and anthropological consequences and even though they go beyond sheer theological implications, two issues deserve specific attention in order to deepen the path of apologetic argument.

Firstly, if it is true that Darwinism implies nihilism, it's not just Christians who are in trouble. Every moral proposal could become impracticable, because the underlying logic governing living beings renders any moral norm ineffective or, at best, irrelevant. Such an ontological reductive position would, in the long run, become self-defeating, and would only satisfy those academics who endorse it. My concern is what would happen if the human person is merely conceived in biological evolutionary ways? What would happen if Darwin's ideas are understood as a denial of any ethical program? Could the Darwinian program be pursued beyond its own theoretical frames? Furthermore, who would then take on the role of identifying the risks entailed by this position in terms of moral responsibility?

Secondly, from a cognitive point of view, it can be asked whether our mind is satisfied with the nihilistic outlook that results from the radical understanding of nature governed by pure chance, or whether this mind requires additional cognitive frameworks in order to understand the world of which it is part. At the end, the issue turns out to be a hermeneutic one, requiring and calling us to make a conscious choice, i.e., for or against the reductive model of human existence.

The main point is that the human person is far too complex in nature and behaviour. Clearly, Darwinian criteria are not enough to shed light on the many aspects of human life. This point emphasizes a general deficiency in the most radical expressions of Darwinian anthropology, but needs to be added to the repertoire of apologetic arguments concerning how theology can survive and adapt to the new scientific context.

How Evolutionary Theory Gives a Hand to Theology

A good deal of what has been stated in the former paragraph could be understood as theological developments triggered by Darwinian Theory or by dialogues with evolutionists. This interaction has prompted many new theological insights. Trying to gather into some clusters the main contributions of evolutionism to theological development, I suggest the following three orientations.

1. A better understanding of the relationship between God and creation, including an interesting reformulation of concepts like creation and providence.
2. A much more realistic approach to human nature which is of crucial importance for the development of Christian anthropology.
3. A way to rethink the questions of evil, suffering and negativity and hence, a better strategy to deal with the theodicy problem and the traditional doctrine of original sin.

Regarding the first point, theologians should be grateful and embrace the theory of evolution, because it allows them to deepen their knowledge of reality and to better appreciate the role that the divine plays in the origin and development of the universe. John Haught is again one of the scholars who expressed this "novelty" brilliantly. He writes,

> "Moreover, evolution has allowed theology to acknowledge at last that the notion of an originally and instantaneously completed

> creation is theologically unthinkable in any case. If we could imagine it at all, we would have to conclude that the initial creation, one already finished and perfected from the beginning, could be not a creation truly distinct from its creator. Such a 'world' would simply be an appendage of God, not a world unto itself; nor could God conceivably transcend such a world. It would be a world without internal self-coherence, a world without a future, and above all, a world devoid of life" (Haught 2000, 37).

Haught's main point, in my view, is that Darwinian representation renders a much more theologically adjusted idea of what a "created world" means, and this new orientation allows for a better representation of the relationships between God and the world, because both need to be thought of as relatively independent and, nevertheless, able to interact.

However, there are more theological advantages when evolution is taken into serious account. Indeed, the evolutionary stance seems more in line with a dynamic theology that sees salvation as a process unfolding its healthy power through history, rather than a static event or just a divine property. Obviously, the historic-salvific theological model has been applied to the short human period in evolution; but taking the process of evolution into account makes it possible to extend the doctrine of salvation backwards to the first moments of the universe as well as forwards to its conclusion. The process becomes dynamic. The salvific work of God may be seen as a constant interplay between chaos and order, in the constraints of thermodynamic forces and its attempts to overcome entropy. Indeed, the application of thermodynamic categories could help to develop a more science-friendly account of creation, evil, and salvation.

The second level of positive contributions concerns the anthropological field. Besides cosmology, anthropology may be deemed as one of the most fruitful fields of theological enrichment. There are several points worthy of comment and exploration. In broad terms, Darwinian ideas have helped to gain a more realistic picture of humans as biological beings, deeply conditioned by their animal constitution. Even though an evolutionary perspective does not provide the full story, it nonetheless contributes enormously to better understand humans. Some important issues at stake are, firstly the tension between self-affirmative instincts of survival and social-altruistic tendencies; secondly what has been coined "natural law" for understanding life, suffering, and death; thirdly the question of freedom and its constraints; lastly the meaning of humans as in the "image of God".

Trying to theorize human nature has never been easy, as very often human complexity has challenged any reductive approach and affected its explicative power. The Christian tradition has often tried to explain human beings along a dual model, i.e. as good and bad, altruistic and egoistic, loving and hating, virtuous and sinful. True Christian anthropology tries to establish an appropriate balance between positive and negative traits. A theology of human creation states that humans, since they are created by God, are good, because as such they reflect the goodness of the divine. However, the Christian tradition also states that human beings have "fallen". Hence, a theology of grace contributes to reconstruct, or to promise a regeneration of, a fallen and corrupted nature.

The question is now in what way Darwinism could contribute? The answer is manifold. Firstly, a Darwinian perspective helps to understand and explain human duality, granting Christian theology a possibility for development and insight into the human race. Indeed, traits such as selfishness and altruism, for example, are essential characteristics for successful human evolution. Humans, as do other animals, strive to improve their survival chances, to gain a reproductive advantage and optimize offspring. Hence, selfishness is a necessary trait for the survival and fitness of the species. However, so is altruism, because it allows for construction of societies, something that has become very complex for the human species. Building such societies requires a huge amount of mutual investment and trust, self-sacrifice and helping behaviours. For

instance, "Post-Axial religions" can be perceived as the result of a broadly felt need to reach a new balance between the contrary tendencies mentioned, allowing for better-integrated social units, or in other words, more adapted to the demanding conditions of human aggregations ever more organized and interdependent. This balance, reaching a more plausible coordination between selfish and altruistic trends, has been the basis for more stable and vigorous societies, giving rise to further stages of development.

When this complex anthropological pattern is taken into account, a more coherent view of human nature emerges, which helps to better understand the traditional Christian picture, namely, the selfish and the altruistic traits are deeply entrenched as the result of an evolutionary process in which such complex duality was selected. Nevertheless, adopting a biological view does not – once again – render a theological view redundant. Rather, this complex human nature, and its apparent amount of imbalance so frequently observed, requires a mechanism able to supply both a profound and meaningful reading of human duality, which also provides a solution for re-balancing human nature and life. The question is, however, whether this mechanism leading to renewed balances is "self-organized", resulting from a spontaneous process, or whether human and cultural evolution have prompted a religious mind in order to reach fruitful and effective anthropological equilibrium?

The issues concerning human nature suggest that a productive openness to evolutionary theory can be fruitful for theology. From such a perspective, the traditional idea of "natural law," which is narrowly linked with the other classic topic of the "order of love," acquires new relevance. Some scholars have already developed theological proposals, adopting the theory of evolution (Pope 1994). Their research looks primarily for convergence between scientific insights and Christian semantics and doctrines. Hamilton's well-known theory of "kin altruism," for example, helps to explain the usual preferences in addressing our compassion and love: close relatives are usually preferred to distant or unrelated people (Hamilton 1964). The convergence between theological and biological insights becomes even more apparent when "natural law" can be linked to "biological traits" necessary for survival and reproductive success.

Once again, the problem is not that an evolutionary perspective contradicts the traditional Christian views. Providing a naturalized understanding of subject matter such as 'natural law' and the 'order of love', the biological perspective not only confirms the inherited moral religious intuitions, but also provides a firmer basis for establishing these principles. In other words, in order to understand the importance of preserving human life, establish a family and engender children, to love your relatives and friends, and help those in need, no longer requires a religiously grounded set of moral rules or a religious anthropology. It seems that we can arrive at the same conclusions without the help of religious thought. The question is however, is an evolutionary metaphysics enough?

Darwinism seems to confirm well-established Christian doctrines as well as to challenge their theistic basis. In my opinion and in spite of the challenges, well-understood Darwinian insights may prove to be fruitful for theology and give theology the possibility to grow and revitalize. However, from an empirical point of view it is doubtful as to whether the awareness of the biological roots of our social constructions is enough to defend such theology or to implement old-fashioned 'natural law'. From a demographic point of view, it can be argued that evolutionary theory does not provide enough evidence or heuristic power to explain the decreasing birth rates in most European countries; something that threatens the long-term survival of these societies. It seems clear, as the philosopher Immanuel Kant once observed, that it is not enough to be aware of some basic human and social traits in order to feel motivated to behave in a particular way, especially when this decision entails a degree of self-sacrifice. Critics of Enlightenment often emphasized the limits in the moral programs rising from modern awareness of self-reliance. Evolutionary thought can sometimes be taken as both a kind of new Enlightenment or as a form of "religion" (Midgley 2002[2]). The problem is that the same mistakes may be repeated, providing a moral program that simply does not work in the real world.

A third important contribution of Darwinism to theology has to do with the hard question of unjustifiable suffering in the world. In some way, it may be considered one of the most fruitful "gifts" of Darwin to religion, as Francisco Ayala claims (2007). I have already introduced this idea above by accounting for the dual constitution of the human nature.

However, Darwinism also helps to better understand the doctrine of "original sin." (Domning and Hellwig 2006). Indeed, the idea of a "universal sinfulness" is linked to the selfish traits required to ensure the survival of our species at the cost of endangering other species and the environment. Christological redemption is then perceived as a subversion of this selfish trait, i.e. as a perfect altruistic trait beyond every other conceivable natural development. The teachings and life of Christ provide a model that disapproves of selfishness and instead suggests an unselfish form of love that is needed if the balance of human nature that has been lost is to be recovered or in order to avoid the tendency to overstate selfish inclination. It seems that the biblical narrative associated with the issue of original sin makes more sense when the biological background is taken into account.

To summarize, evolutionary science can become a good companion to traditional theology, not just a concurrent or destructive force requiring the sacrifice of deeply rooted beliefs. It is interesting how old issues such as God's providence and the idea of atonement in Christ (Shults 2008) find new expressions through new biological understanding, enriching the repertoire of available theological insights.

Theology Changing Format, Assumptions, and Method

Taking Darwin's legacy seriously implies some modifications of the theological mind, because it is somehow affected by this theoretic "evolution". Similar to the way other disciplines have done, the discipline of theology is called to evolve. Needless to say theology is affected by the knowledge that the theory of evolution provides, despite some loose ends of the theory and the criticism it receives in different scientific and philosophical environments. Conflicts are unavoidable, but at the same time, well-met challenges can be turned into opportunities, when properly understood.

At least three suggestions deriving from the current biological development invite a revision of the theological mind:

1. a more dynamic view of reality;

2. a conscious pragmatism; and
3. a consequent level of realism.

Theology is called to integrate a more dynamic view of reality, instead of the traditional static one. The world and everything in it has evolved. This is a kind of "axiom" derived from the theory of evolution and dominates the scientific perspective of reality. It has obvious precedents in Hegelian philosophy as well as in other philosophical thinking of the nineteenth and twentieth centuries, e.g. Alfred Whitehead's "process philosophy". Theology needs to be aware of the challenge the theory of evolution poses to its traditional static versions deriving from ancient and medieval theologies. A world of "essences" needs to give way for a world of "processes". Where a harmonic and stable order was once perceived, now instability, entropy, and new adaptations constitute the building blocks of our permanently unsteady situation. A different theological paradigm needs to be supplied, after taking into account the state of things and its corresponding well-established theoretical framework. Perhaps, only the doctrines (semantics) of love and mercy of God remain unchanged. Possibly, this changing universe calls for an external fixed point, not only in the form of a designer, but also an external frame of reference which can give the world what it needs, namely some minimal certainties providing purpose and hope. In my opinion, the evolving world is compatible with a stable and trustworthy God.

The rules governing reality appear to be largely pragmatic: the better things work, the better the chances are for survival; the better the performance is, the greater chances are given. This view goes against the Christian line of faith of freely given, undeserved rewards. The Darwinian model, even though if it does not entirely explain all causes of evolution, consecrates a view in which success is measured by the degrees of adaptability and fitness. Some lessons may be drawn. Christian proposals or ideas, models of Church and of other religious communities are submitted to similar selective pressure. The fittest will survive; the others, even if they have a long history of dominance and power, will gradually become extinct. Social and cultural processes may not follow the same kind of evolutionary pattern of the biological world, but it would be naïve to pretend that social realities could avoid this

scenario. This means that, beyond ideologies and rhetorical profusion, what counts in the end is the ability to avoid the entropy that leads to extinction. Churches, pastors, and theologians are called to learn this seemingly hard lesson, if they want to prevail. Perhaps Christian faith may be rediscovered as a necessary or useful element of contrast, an alternative point of view needed for reasons of complementarity. Indeed, the "way of grace" does not necessarily adhere to the strongest or the fittest.

The Darwinian view introduces a healthy amount of realism into Christian anthropology, plagued by excessive idealism in recent years. Starting from a more realistic account of human nature, it yields a better scope for humans to be able to cope with their problems and distress. Several modern theological developments have been affected by this fallacy, namely to assume an ideal universe in order to be able to comfortably challenge the most painful facts bound to our biological nature. By doing so, the logic of the evolutionary process that affects human life is ignored with the consequence that theology becomes unable to deal with the real needs of human beings and is limited to work on the basis of inadequate prognosis. The present point complements the former one, because pragmatism is closely related to a more realistic perspective of reality. As a result of its contact with biology and other sciences, theology should become much more "empirical" or even "experimental." Theology still has a lot to learn from the way in which scientific research proceeds, starting from the observation of real, concrete human life, and developing models with the highest possible explanatory power. In a similar vein, theology is called to adapt a research method that renounces excessive security based upon aprioristic ideas, but instead accepts a certain degree of probability similar to that used within contemporary science. However Christian faith is called to provide an alternative view, a view open to imagination, promise, and hope, where new forms of life may be conceived beyond the narrow framework of scientific knowledge.

In a nutshell, theology can learn from Darwinian thought how to assimilate useful insights. At the same time, it is invited to rediscover dimensions of Christian faith that are highly relevant for solving the problems caused by contemporary secular worldviews. Faith provides hope, purpose, and courage, all of which are needed precisely because

otherwise all that is left are the laws of evolution. Darwinism does not necessarily render religion redundant. In the wake of the evolutionary understanding of reality, the divine becomes more necessary in order to make sense of that empty panorama.

The theory of evolution will not constitute a dominant paradigm in contemporary theology, but it will help to offer much more nuanced thinking for a generation deeply conditioned by Darwin's thought. To fail to take Darwin into account amounts to removing the rational roots of Christian reflection, and putting at risk the entire Christian message with the hope that is preached in the name of Christ and in his Church.

Beyond Darwin

Evolutionary Pluralism and the Manifold Expression of Christian Anthropology

A radical evolutionary perspective clearly states the redundancy of every attempt to insert a religious or divine agency in any human process, because its origins can be fully explained in natural scientific terms. At a methodological level the application of the "principle of exclusion" or "parsimony" rules out additional causes or reasons for a process already explained at a physical or biological level. However there are other points at stake too, even if these can more easily be negotiated. Take for example, the philosophical/theological theory of dualism, i.e. the body-mind/soul problem. Indeed many theologians do not feel comfortable with traditional anthropological dualism and try alternative approaches to overcome what they consider a metaphysical encroachment into the original Biblical world view.

Moving beyond Darwin's original theory, it is time to ascertain the impact of recent developments in Christian Anthropology, taking into account the plurality of proposals and research programs derived from the Darwinian paradigm. To this end, three lines of study are proposed. The first consists of an exploration of the internal pluralism of the way evolutionist thought is currently interpreted and aims to show how this insurmountable pluralism may affect theological understanding. Secondly, the study of human complexity may provide a better

application of Darwinian ideas. Thirdly, recalling Christian theological pluralism may lead to a healthy move when both the issues of Darwinism and theology are being addressed.

How Darwinian Pluralism is Relevant for Christian Anthropology?

Traditional Darwinism or evolutionism becomes problematic in view of some late developments of this theory. Indeed, recent discussions concerning how to interpret Darwin's legacy invite reconsideration of its theological impact. Different models compete in presenting the complex phenomenon of natural evolution in a more plausible manner. This evolutionary pluralism was one of the topics that were addressed at the III STOQ (Science, Theology and the Ontological Quest) Conference: *Biological Evolution: Facts and Theories*; held in Rome, 3-7 March 2009. Indeed, the audience became acquainted with a diversity of views on the way evolution and natural selection may be understood, represented and modeled.

The standard position obviously defended the principle of natural selection, the survival of the fittest and the principle of genetic inheritance of personal traits by subsequent generations. The later principle – consideration over a long period of time – could explain the emergence of different biological types. Indeed, the combination of genetic variations and natural selection may lead to new and better adapted forms of life. Nevertheless, endeavours to obtain such a broad consensus ended at an early stage because of the competition amongst the diverging theories to provide better explanations of the process of evolution.

Perhaps one of the sharpest lines dividing the field of cosmic evolutionary studies distinguishes between those pointing to a more open, unpredictable, and chance-governed (stochastic) universe, and those stressing a more closed, convergent universe, governed by (deterministic) attractors and self-organizing systems. This is clearly a metaphysical question entrenched with the sheer scientific understanding of reality, but is nevertheless of interest for theology. Theoretical ecologist Robert Ulanowicz (2009), defends the open model, which is rather probabilistic and anti-deterministic, allowing for divine intervention. Others, like for instance palaeontologist Simon Conway Morris (2004), defend the idea of a convergent universe, which can be

interpreted – from a theological perspective – as a sign of purpose or providence.

The second line of reasoning clearly separated those who stressed an almost exclusive role for natural selection like Douglas Futuyma (2009) and Francisco Ayala (2010); and the group of scholars who argued for an evolutionary model based on more factors, like those pointing to epigenetics: Scott Gilbert and David Eppel (2008); Stuart Newman (2003) and Anne Dambricourt-Malassé: or those who stressed the role of symbiosis like Lynn Margulis (1998).

Furthermore, a third line of demarcation distinguished between positions that defended gradualism and those who defended Stephen Gould's theory of punctuated equilibrium. The list of factors involved in the evolutionary process can still be enhanced by applying proposals that stress levels of complexity and by way of applying the systems theory. For instance, the work of theoretical biologist Stuart Kauffman (1996), Italian biologist Ludovico Galleni (2003), mathematician and philosopher of science Dominique Lambert (2004) are good examples. As one would expect, the question of the units of selection was discussed. Different proposals stretched from the molecular level (e.g. the Swiss microbiologist and geneticist Werner Arber), and the gene level, to the group level (e.g. biologist David Wilson), beyond the traditional view stressing the role of individuals.

In the area of anthropological theory, the stress was placed on the molecular level (Olga Rickards and Gianfranco Biondi), the physiological or behavioural level (Robin Dunbar), or on the cultural level (Colin Renfrew), being distinct factors that affect human evolution[16].

The panoramic view presented above gives us an idea of the current debate and illustrates the complexity of the field. Perhaps this

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16 It is better to avoid, for the moment, dissident voices of those who openly challenge the dominant line of thinking such as Jerry Fodor. His aim is to deconstruct the entire selectionist model and to highlight the more "channelling" forms of evolution (Fodor and Piattelli-Palmarini 2010). Nevertheless it is good to keep in mind that the presence of such mavericks constitutes evidence for significant unresolved questions about evolution and its mechanisms.

helps us to avoid simplifications. The question now is what are the consequences of such pluralism for Christian theology?

A prime consideration is that the biological worldview is less deterministic than the one provided by Newtonian (or classical) physics. Indeed, the biological worldview seems to be more probabilistic. This is because it often needs to be understood through competing models. Because human biology has to deal with very complex reality, it belongs to what Jerry Fodor coined "special sciences" (1974). As such, its status and methods are difficult to include into a purely bio-mechanical "naturalistic" model. Any attempt to reduce some phenomena of human life to the physical and mechanistic levels of reality risks missing the complexity and "emergent" levels specific for human reality. In Stephen Horst's own words, "reduction is not a good strategy" (2007). Does this imply that biology, especially its studies of evolution, as a science has weakened? Absolutely not. Rather, such practice enriches and challenges biology. However, the observant theological eye may perceive an interesting development that is useful for its anthropological program. If evolutionary biology were to recognize a statute of irreducible complexity beyond the mechanistic level as well as an unavoidable pluralism of interpretations, its theological impact would be better buffered. That did not used to be the case with the standard understanding of evolutionism pleading for a mechanical and simplified view of the world, including human beings and their social structures. Understanding non-reductive evolutionism is helpful in order to obtain a more nuanced reception of its anthropological consequences.

There are some motives related to the former point, which can be seen from a theological perspective. One of the most relevant is the end of the "consilience dream", as Edward O. Wilson (1998) put it; i.e. the end of the utopia of an all-encompassing theory able to embrace all different levels of reality in order to obtain "unity of knowledge". Such unity does not exist at the level of biology, let alone when other still more complex levels are involved: anthropologic, cognitive and social. Human nature cannot entirely be understood from a macro-level-theory only. Rather, it needs appropriate methods commensurate with a proper level of complexity and characteristics of its object.

To conclude this section, more can be said about theology coming to terms with new and emerging scientific theories. The number of

interlocutors continuously increases which implies that theologians may apply different approaches when they adopt evolutionary science in their theologies. Some of them emphasize freedom while others focus on determinism; some emphasize the individual dimension while others emphasize the importance of community as the unit of selection. Some are more concerned with individualistic behaviour while others are more concerned with cooperative or symbiotic processes. To ignore this level of complexity and the many choices to be made could inhibit a much more fruitful interaction pointing to richer outcomes that benefit both science and theology.

What about Human Nature? Does it Make Any Difference?

The second issue worthy of a deeper look concerns human nature as the subject of evolutionary dynamics. To deny that humans are a product of a process of evolution similar to what gave rise to the other species would invite severe criticism, as many proofs point to a long development from earlier hominids to the *Homo Sapiens*. For instance, there is enough evidence for this view from palaeontology (fossils), and genetic biology. However, this realization does not imply that our non-human ancestors had all the characteristics of contemporary human beings. There are some species-specific traits in humans, such as advanced cognitive abilities and the ability to use symbols, to communicate in an advanced and complex manner and to create societies, artefacts and other realities. This is what makes humans unique.

What are the consequences of human uniqueness for the evolutionary view? To start with, humans have most likely followed a standard path of evolution and have been subjected to usual types of species-unique selection pressures similar to other species. According to the standard Darwinian evolutionary theory, living beings are driven by the forces of survival and reproductive success; humans are in principle not an exception in this. However, new factors or variables have gradually been added to the evolutionary process of the human species. When they reached a critical mass, they elicited a change of the pattern that governs the common evolutionary process. This implied that human life became less deterministic, especially where human behaviour is considered. In other words, it would be a presupposition that all human behaviour is driven only by the simple forces of survival and

reproductive success. There are many human-unique factors that this simple survival-of-the-fittest model does not accommodate.

Humans have evolved to a state where many new variables need to be considered, given our capacity for intelligence, self-reflection, complex emotions, planning, goals and desires, to name but a few. Once human symbolic capacity reached its critical mass (Deacon 1998), human intelligence and all its power for better representing its environment, for establishing alliances, or foreseeing the future, the subsequent rhythm of human evolution accelerated exponentially. It would not be exaggerating to affirm that in human beings the purely biological program is surpassed by the growing influence of these new factors, specific to the human constitution. This is not to say that some of these factors are not present in other species to some extent, i.e. the great apes.

Regarding the question posed in the title of this section, it becomes clear that the specific traits of human nature introducing new elements to it render difficult a possible application of the standard evolutionary rules that govern other species. One principle of the theory of evolution dictates that the fittest genes become over-represented in subsequent generations. However, for what concerns the human species, this principle explains only a component of the multiple factors intervening in the human-evolutionary process. For example, emotions, symbolic capacities, social and cultural dimensions are also involved. Indeed, the emotional or affective human capacities are not to be neglected, which discourages any attempt to reduce these capacities to by-products of biological pressures. Very often the shared feeling in our culture is that emotions drive and govern behaviour in a way hard to predict. This drive certainly goes beyond deterministic rules governing other types of biological patterns and the physiological or biochemical levels.

When social and cultural factors are considered, things become even more complex, implying that the evolutionary process becomes more open and uncertain. Recently, several authors have stressed the need for a broader view of human evolution and suggest that a "co-evolution" of nature and culture must have taken place (Richerson and Boyd 2006). Other studies stress the importance of the social or distributed nature of human cognition for human evolution (Hutchins 1995). In other words, the cultural dimension has played and does play a crucial role in human development and the success of the species. This

cultural dimension is complex and includes art, religion, morality, and meaning, amongst other things. Humans constitute the only species in which its individuals can consider such issues as the meaning of life.

Once more, the theological consequences of these perceptions are crucial. Recent scientific anthropology can provide a kind of "buffer" to a reductive version of evolutionary theory. In other words, when the new complexity of evolutionary factors is taken into account, theological reflection finds a firmer basis from which it can develop its own view without the constrictions imposed upon it by the traditional version of evolutionism. A more fruitful hypothesis is that the theory of evolution, which may be able to predict the behaviour of non-human species, requires a modification when applied to humans. Indeed, the theory would need to be able to take the complexity of variables involved in human evolution into account. The biological program is limited to highlighting some of the dimensions of human life. It can explain some aspects of human behaviour, i.e. biological altruism, biological love, protection of the offspring/family/society... But it cannot by itself explain more advanced and complex human traits and behaviour such as conscious reflection, romantic love, philosophy, and religion.

Modern Christian anthropology does not stand aloof from biological evolutionary principles but it also has the possibility to account for the non-biological aspects of human evolution.

More than one Theology: The Issue of Theological Pluralism

If scientific pluralism affects evolutionary studies, theology is no less concerned by this trend, as theology has a rather similar predicament of its own. Indeed, there is more than one way to represent the mystery of God and to model God's relationships with the world (Campbell 2006). Hence, it would be more accurate to talk about "Theologies and versions of Darwinism", than merely about "Theology and Darwinism".

At conferences on science and theology it often happens that the dialogues are held on four different levels: *theology A* and *theology B* on one side; and *science C* and *science D* on the other. In other words, different competing theological traditions dealing with different competing scientific traditions are presented. Some examples can help to clarify this increasing amount of complexity.

Theological pluralism requires addressing the complexity of how the different available models or interpretative frameworks developed out of their own history are organized. One way to do this is to place the different models around axes of coordinates. This counts for both theological and Darwinian pluralism. One of the main axes distinguishes between more liberal and more orthodox theological positions. In more technical language, it makes a distinction between more incarnate and more redemptive versions, applying a more theologically inspired semantics. Obviously, liberal Christian theologies will try to relate to scientific ideas in a different way compared to more orthodox Christian theologies. The more radical Christian theologies will tend to assimilate scientific understandings, while the moderate Christian theologies rather tend to be more discrete, negotiating in a limited way the content of their professed beliefs.

A different and perhaps more plausible model places different Christian anthropological positions around an axis in order to discriminate between levels of negativity and corruption that affect human nature as a consequence of the doctrine of original sin. Such theological models have the advantage of being able to account for contrasting anthropological representations; namely, humans as irremediably selfish and unable to do good on the one hand; and humans as perfectible beings, less affected by original corruption, and constantly regenerated with the help of divine grace, on the other hand. Such models can also account for the issue of freedom. Indeed, on the one hand there is the theological tradition pointing to a deep alienation of human nature as well as its inability to make the right choices because human freedom is polluted or deeply biased. On the other hand there is the view that stresses an unalienable level of freedom, making humans similar to or "images of God", able to accept or refute His salvific help. The issue of love and community is, amongst other characteristics, yet another trait this model could account for. While one tradition argues that the life of faith is something personal and private and reminds us of the dangers of community or social environments, another tradition defends a loving and communitarian vocation of all humans, called to social reciprocity and mutual support.

Taking into account the outlined distinctions it becomes relatively easy to establish a complex network of plural and possible relationships

between evolutionary theories and theological anthropologies. For example, those showing the openness and indeterminism of the process could feel in good company with theologies of freedom; while those stressing its predictable and closed character seem to converge with deterministic theologies and theologies of predestination.

Scientific accounts of evolution of the individual will seem plausible to individualistic theologians while accounts of symbiotic processes and group selection can be reflected in more communitarian theologies. Accounts of the evolutionary principle *the survival of the fittest*, could find a great degree of agreement from pessimistic theologians; while accounts of biological altruism could fully satisfy the expectations of more positive theologies, because these theologians focus upon the good side of the human nature. Indeed, sometimes theologians feel closer to friendly scientific positions than to competing theological traditions.

All this means at least one thing. We cannot reduce the complex issue of the relationship between science and theology to a simple discussion of two bands, or even worse, to a zero-sum relationship. This is especially the case where the impact of contemporary Darwinian thought on a plurality of Christian models is debated. Scholars and scientists working within the field of Science and Theology are called to map the territory and to classify the different positions in order to show the multiplicity of complex interactions between the sciences and theologies. Only then will they do justice to a multicultural- and academic panorama.

As a brief conclusion, the three aims of the last paragraph can be formulated as three theses:

1. Evolutionary studies come in a large variety of versions and can therefore not be reduced to one “standard version”. Consequently, this pluralism helps to soften its theological impact.
2. The evolution of the human species includes emergent factors rendering its outcome much less predictable, more complex and irreducible to only biological models.
3. Also theology is a plural enterprise and hence allows for many ways of interaction with the large variety of interpretations of the theory of evolution.

The expectation is that these theses may help to better assess the issue of the impact evolutionary studies have on the field of Christian anthropology, beyond the usual simplifications reflected in the media and present a more nuanced version of this relationship.

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Pragmatism and its Relevance for the Science/Religion Debate

Eberhard Herrmann

Introduction

I suppose philosophers are like most people in that there are things we are afraid of and things we value. Personally, I am afraid of advocates of scientism who claim that we should look to the sciences alone to answer all our questions, including moral and existential ones. I am also afraid of religious people who claim that their right to their own religion is unrestricted. I am afraid of intolerance since it goes hand in hand with oppression, marginalisation, and even violence. Intolerance forces people to put up with what they do not like, do not believe, or do not appreciate; thus, it offends their integrity and autonomy, which, in my opinion, are highly valuable. I suspect that intolerance, as a consequence of dogmatic truth claims, more often than not indirectly builds upon the philosophical standpoint called metaphysical realism. So, if it could be shown (1) that metaphysical realism is philosophically untenable, (2) that its correspondence conception of truth is particularly problematic, (3) that there is actually an alternative, which, inspired by some of Hilary Putnam's writings (Putnam 1981, 1994, 1999, 2004), I will call pragmatic realism, and (4) why pragmatic realism and its conception of truth does not tend to lead to intolerance, then perhaps a more prosperous way of discussing the relation between science and religion can be developed. My own contribution to the debates on realism and the relation between science and religion is situated within this framework. Although this pragmatically realist way of discussing the relation between science and religion is a kind of naturalism, it is not naturalism in the metaphysical realist sense – as in scientism –, but rather in the sense that it does not presuppose specific religious beliefs.

Metaphysical realism

As far as I know, the usual and accepted perspective on truth in religion, as well as in science, is that which I will call metaphysical realism. Roughly speaking, by 'metaphysical realism' I mean the claim, first, that things in reality have properties and stand in relation to each other independently of language and concepts and, second, that these language and concept independent properties and relations determine which of our judgements on reality are true, i.e. which judgements correspond with reality. Most likely, nobody would deny the claim that a judgement is true if and only if it is the case as is maintained in the judgement. The philosophically crucial question, however, is what conclusions can reasonably be drawn from the idea of truth as a correspondence relation with reality.

To conceive of truth in a metaphysically realist manner is to conceive of religion and science as dealing with the same thing, namely reality as it is in itself. The metaphysically realist conception of truth implies that when a truth claim is raised, there can be only one true description: either reality is as it is claimed to be, or it is not. Let us first imagine a metaphysical realist who claims that true descriptions of reality can only be found in science – either in practice or in principle. Such a claim implies that religion, if it cannot be eliminated through education, can be no more than a private matter. Second, let us imagine a metaphysical realist who claims that true descriptions of reality can only be found in religion and, furthermore, that real truth has been exclusively revealed in his/her own religion. According to this position, one's own religion, and only one's own religion, should dominate every aspect of life, and if this is not practicable for political reasons, then other religions can be tolerated to an extent but no more than that, and non-believers are not tolerated at all. Third, let us imagine a metaphysical realist who is cautiously inclined since we seem unable to determine decisively, either in religion or in science, which judgement of reality is true. Scientific as well as religious truth claims should therefore be given space to compete with each other. This kind of metaphysical realism is also called critical realism.

Although I sympathise with the latter attitude, I object to the metaphysically realist presuppositions underlying it. My first objection to metaphysical realism is that it leads to scepticism. If it is reality as such, irrespective of how we conceptualise it, that determines which judgements, descriptions or theories of it are true, then we can never actually be sure that we are right, since we rely on concepts in order to know something about reality and in order to say something true of it. Although errors and mistakes are made, it is nevertheless obvious that we have at least some justified truth claims about reality at our disposal. Furthermore, we do not happen to run into justified truth claims only by accident but also as a matter of conscious theorising and testing. Otherwise, humans would probably not have survived. Thus, if metaphysical realism leads to scepticism, and if scepticism – in the sense of never being sure whether our judgements correspond with reality – is not an option in our lived lives, then there is something problematic inherent in metaphysical realism. This brings me to my second objection, which is closely related to my first. Since we do not have a God's Eye point of view, we cannot even imagine what such a perspective would be like, apart from the fact that it would not be ours. The metaphysical realist's claim that truth corresponds with reality as it is, independent of human conceptualisation, either tells us nothing or amounts to the incoherent claim that we can identify reality before we can actually identify it. We cannot identify reality without drawing on our conceptualisations of it.

Some philosophers have excessively stressed the crucial role conceptualisations play in our search of truth, thereby choosing an extremely relativist manner of dealing with the truth question. Since we can never actually decide which judgements correspond with reality, as shown by the fact that metaphysical realism leads to scepticism, there is no point in asking for the objective truth of any judgement at all. If we nevertheless want to use such a term as truth, we must relate it to some context. Whether a judgement is true depends on the conceptualisation and the life world that the judgement is part of and it also depends on how useful or attractive these conceptualisations and life worlds are to us. All truth claims, whether they are raised in religion or in science, are relative to their context. No truth claim as such can demand ontological or epistemological priority. Seen from this relativist perspective, all

judgements of reality appear to be, in principle, equally legitimate. However, seen from another perspective – the perspective of the lived human life – not everything in religion and science is equally legitimate for the simple reason that sciences as well as religions exercise a deep influence on human life, for better or worse.

In order to protect the objectivity of truth, it would therefore be tempting to fall back on metaphysical realism and its correspondence conception of truth. Let me show how the objectivity of truth can be defended, without presupposing metaphysical realism, by distinguishing between one concept of truth and different applications of the distinction between true and false in different practices. This will be the next step towards a pragmatically realist conception of truth.

The concept of truth

The traditional correspondence theory of truth tries to conceive of how a judgement relates to reality in terms of how it corresponds with what reality is like irrespective of how we conceptualise it. Sometimes it is said that the truth of a judgement lies in its correspondence with facts, but when is something a fact? Facts are not objects existing in reality. Instead, "we call a thought a fact, if the thought is true." (Tugendhat and Wolf [1983] 1993, 232). In that sense, we sometimes use 'fact' and 'truth' synonymously, which has given rise to the so-called redundancy theory of truth. According to this theory, the phrase "it is true that p" is equal to p. The question is whether this is really the case.

When a thought is claimed to be true, i.e. when a judgement is made by somebody, for instance, the judgement that the sky is blue, a specific truth claim is implied. This truth claim is made explicit in the phrase "It is true that the sky is blue." As a truth claim it marks a relation to reality: If a person asserts that the sky is blue, then he or she asserts that it is really the case as he or she claims it to be. The redundancy theory fails to claim that it is really the case as it is asserted to be. Thereby, the redundancy theory fails to make a distinction between a thought p and the claim that it is true that p. This distinction is closely linked to the

distinction between the truth claim and the issue of whether the truth claim is justified or verified.

There is a distinction between what is true and what is verified because something can be true, i.e. something can be the case, for instance, the claim that Caesar woke up on his right side on his first birthday, even if we have no possibility of verifying or justifying it. Furthermore, whereas verification is always someone's verification, truth is not claimed to be relative in that way. (By the way, even the extreme relativist claim that truth is always truth-for-me or truth-for-us, presupposes non-relativist truth for this relativist claim.) However, in order to understand what it means that a certain judgement is true, we need to know what it means to verify or justify it. We will get back to this distinction, but first, let us have a look at Aristotle's definition of truth – that a judgement is true if and only if it is as is claimed in the judgement – as Tarski has applied it in his so-called truth scheme that ''p' is true if and only if p'.

Following Tugendhat and Wolf's interpretation of Tarski (Tugendhat and Wolf [1983] 1993, 226-229), I want to emphasise some aspects of his truth scheme that are important for my orientation towards a pragmatically realist conception of truth. According to Tarski, the sentence ''p' is true if and only if p' tells us in the meta-language under which conditions the object language sentence p is true. For instance, in the meta-language sentence ''snow is white' is true if and only if snow is white', it is indicated under what conditions the object language sentence 'snow is white' is true, namely, when snow is white. The point of the scheme is that every true sentence has to fit it.

Because of the paradoxes that are present in everyday language, Tarski restricts his discussion to formal languages with given postulates and determined rules of deduction. The aimed-at definition of truth is characterised as semantic in the sense that it is valid only for sentences that are truth functional; in other words, the truth of a sentence is strictly related to the truth of other sentences. In order to reach a definition of truth, one must first analyse the compound sentences into singular predicative ones of the form Fa, which include singular and general terms. Fa, for instance, 'Snow is white' is true if and only if the object snow, characterised by the singular term 'snow', falls under the concept white, characterised by the general term 'white'. In order to be able to

determine whether that is the case, and this is the second requirement for a definition of truth, two lists are needed. On the first list, all the singular terms in the object language relate to the objects. On the second list, all the general terms in the object language relate to the concepts. In formal languages, these lists are finite.

The next step towards a pragmatically realist conception of truth is to relate Tarski's truth scheme to reality. We remember that according to Tarski's truth scheme, 'p' is true if and only if p. Considered a judgement, that which is named 'p' is claimed to be true. After analysis into singular predicative sentences, we get Fa, Gb, et cetera, claiming, that is, that an object F, G et cetera is a, b et cetera. Fa is true if and only if the object F, characterised by the singular term, falls under the concept, characterised by the general term. Now, in order to know which objects a singular term can be applied to, one has to know the rules governing the identification of the objects, and in order to know what a general term means one has to know the rules governing the use of this general term. And the rules are different depending on what praxis we are dealing with – for instance, science or religion. So let me now present a pragmatically realist conception of truth.

Pragmatic realism

In order to forestall any misconceptions, I want to emphasise, first, that I distinguish between conceptions of truth and the concept of truth. The latter, i.e. the formal Aristotelian definition of truth, that a judgement is true if and only if it is the case as is claimed in the judgement, functions as a formal claim whose requirements must be met in order for an idea to be a conception of truth. For instance, a conception of truth such as that which your peers let you get away with saying does not meet the requirements of this formal claim since what you say may be false, even if your peers let you get away with saying it. Second, I want to emphasise that my proposed pragmatically realist conception of truth does not amount to the so-called pragmatic theory of truth according to which a judgement is true if and only if acting upon it yields satisfying practical results. Such kinds of truth definitions are doomed to fail. Even when

acting upon a judgement yields satisfying practical results, one can always ask whether the judgement is really true. Thus, being useful and being true are different things entirely.

Nevertheless, how we conceive of truth has to do with our different kinds of praxis and the different conceptualisations combined with them. In pragmatic realism, the truth question is important since not all our conceptualisations of reality work. However, when we raise truth claims about reality in its different aspects, we refer to reality as already conceptualised by other humans. We cannot develop and apply other concepts of reality than those which suit us as the biological and social beings we are. If we were birds or had eyes on our knees, we would need other concepts to help us orientate ourselves in the empirical world. If we lacked the ability to be aware of the reality of death, we would have other concepts to help us mould our social world.

This does not diminish the plausibility of the claim that the question of which judgements are true has to do with what is actually the case. A judgement, whatever it is about, is true if and only if it is the case as is claimed in the judgement. The philosophically crucial question is what conclusion we can reasonably draw from the concept of truth together with the insight that although reality is more than we can conceptualise, nevertheless, when we talk about reality, i.e. about what there is and in what way it is given, we do it from the perspective of our human condition. In that sense, ontology is dependent on us being the biological and social beings we are. This means, among other things, that we cannot discuss what we mean by truth and how we decide what is true unless we relate those questions to how we actually learn to distinguish between true and false in our different kinds of praxis. In contrast, according to the metaphysical realist, the fact that we live with different kinds of praxis has no relevance for what we mean by truth and how we conceive of what determines whether our truth claims are justified. Therefore, still according to the metaphysical realist, there is, in principle, no difference between the truth claims raised in the religions and the truth claims raised in the sciences. Truth claims refer to reality as it is, independently of language and concepts, and it is this reality with its properties and relations, independent of language and concepts, which determines which of our judgements on reality are true.

The pragmatic realist views things differently. On this view, reality for us humans is always conceptualised reality, conceptualised by means of concepts that humans have developed in their different kinds of praxis in interaction with reality; therefore, the pragmatic realist cannot disregard how we humans actually conceptualise reality by conceptualising our experiences of reality offering resistance in different ways. Roughly speaking, we can distinguish between observational and existential experiences. We experience reality offering resistance, not only in our observational experiences, but also in our existential experiences of the inevitabilities of life, such as suffering, guilt and death as well as joy, love and happiness. In the sciences, observational experiences are transformed into knowledge about those aspects of reality which can be inquired into empirically, knowledge which, in turn, determines how we conceptualise our observational experiences. However, the circle is not completely closed since, for instance, unexpected experiences of how reality offers resistance empirically may lead us to revise a certain way of conceptualising reality, i.e. a certain theory, or to introduce a new one.

Similarly, existential experiences of the inevitabilities of life are, in religions and their secular counterparts, transformed into insights into what it means to be human, insights that in their turn determine how we conceptualise our existential experiences. When the conceptualisations are not existentially adequate any more, this may lead us to revise the existing conceptions, images and narratives, to introduce new interpretations of them, or even to introduce a new religion or ideology. Both concerning observational and existential experience, we are dealing with shared experience because of shared praxis. This means that how we conceptualise our experiences of reality offering resistance in different ways reflects different kinds of praxis. Science and religion are such different kinds of praxis in our lives.

The pragmatic realist concedes that the metaphysical realist has a point in emphasising that we cannot cause truths about reality just by introducing certain concepts. According to the metaphysical realist, the reason why we cannot do this is that it is reality that, independently of language and concepts, determines which of our judgements on reality are true. According to the pragmatic realist, this kind of reasoning disregards the fact that, in making such a metaphysical realist claim, we

already have a certain conceptualisation of reality in mind. According to the pragmatic realist, the reason we cannot cause truths about reality just by introducing certain concepts is instead our constant interaction with how reality offers resistance. It is not only physical, but also existential, empirical resistance. In our different experiences of the resistance reality offers, we learn that not all our efforts of conceptualising reality are successful. We cannot just walk through a wall of concrete presupposing the conceptualisation that we are disembodied spirits. Our bumping into the wall reminds us that this conceptualisation is not reasonable for us humans to have. Moreover, we cannot deal with the inevitabilities of life by introducing definitions that minimise their significance. Even if it can be explained, by pointing to certain chemical processes in the brain, why a person is attracted to certain persons and not to others, requited and unrequited love is still part of reality. We cannot deny love by introducing definitions that minimise its significance. The resistance reality offers in this regard reminds us that the exclusive conceptualisation of love in terms of chemical processes in the brain is not reasonable for us humans to have.

Referring to the resistance reality offers, the pragmatic realist can also maintain that reality is independent of us; however, this does not force the pragmatic realist to say anything about what reality is really like. This is also true with regard to, for instance, our ideas about what Earth was like before we humans entered the scene as a result of evolution, according to the scientific explanation, and/or as created by God, according to the religious explanation. As soon as we say something about reality, even if we are talking about reality before humans existed, it is conceptualised reality we are dealing with, and this reality is conceptualised differently by different shared experiences in combination with different kinds of shared praxis. As the biological and social beings we are, with a body, a brain, emotions, knowledge, insights, expectations, values and fears, we interact with reality in different kinds of praxis combined with different conceptualisations of reality. Science and religion are such different kinds of praxis, dealing with different experiences of how reality offers resistance.

According to the metaphysical realist, such distinctions have no relevance for the question of reality and truth. According to the metaphysical realist who argues in favour of scientism, i.e. the view that

the natural sciences have both ontological and epistemological priority on all questions raised by humans, the domain of the natural sciences is the only reality there is. According to the metaphysical realist who argues in favour of religious fundamentalism, the only reality is that which God's revelation refers to and which concerns all aspects of human life. According to the cautious metaphysical realist, or critical realist, there is only one reality, which we try to come as close to as possible in our scientific and religious descriptions, and this reality determines which of our religious and/or scientific descriptions are true, even if we may never know which descriptions really are the true ones.

I have already presented the reasons why it is impossible for me to accept metaphysical realism, even in its cautious version. In a certain sense, we humans live in one and the same reality, a reality which offers us resistance in different ways, empirically as well as existentially. Our different ways of interacting with reality, in science and in religion, must then merge in the lives we live in order for us to survive and live a good life. This is not about whether there are inconsistencies between scientific and religious propositions. It is about merging different practices in our lived lives. For that, we humans need to conceptualise how reality offers resistance, both in our observational experiences of reality and in our existential ones. We need both perspectives since we are organisms that consciously and intentionally have to relate to our surroundings in different ways.

Humans have developed the sciences on the basis of shared and well-tried observational experiences and the different kinds of praxis they are combined with. Empirically adequate scientific theories help us say what is true about the observable. Also when it comes to the existential experiences and the different kinds of praxis they are combined with, we have a basis of shared and well-tried experiences. We can tell when people are in grief and, in the best case scenario, provide them with existentially adequate conceptions, images or narratives. These conceptions, images and narratives do not take away the causes of grief but they may help people live with the inevitabilities of life by saying something true about what it means to be human. We humans have developed religions and ideologies on the basis of shared and well-tried existential experiences and the different kinds of praxis they are combined with. If their conceptions, images and narratives are

existentially adequate, they provide us with insights into what it means to be human.

Seen from this pragmatic realist perspective, the sciences, on the one hand, and the religions and their secular counterparts, on the other, have different functions in our lives and thus cannot compete as to which can offer the one and only true description of reality. In spite of this difference in function, there is nevertheless an important connection between the sciences, on the one hand, and religions and their secular counterparts, on the other. The connection manifests itself when we consider the fact that we humans, since we are the biological and the social beings we are, are also moral subjects, i.e. morally responsible for the good life of other beings. The responsibility displays itself, for instance, in our love of people close to us so that they, too, can live a good life. Certainly, not everyone can or wants to take this responsibility. Different kinds of egoists propagate against the view I am advocating here. However, unless these egoists choose to live a life in complete isolation, they forget that, for the sake of survival and the possibility of them living the lives they want, they are dependent on other people who give them the right to be part of a social context in spite of their being egoists.

Religions and their secular counterparts help us express our predicament as moral subjects, a predicament which is also characterised by failure when it comes to living a good life and helping others do the same. In practice, an individual's concrete moral responsibility for the good life of other beings can only apply to a minority. In order for this responsibility to apply more widely, there must be political ideologies. Whether these political ideologies are religious or secular, they help us transform the love of individuals into collective solidarity. Furthermore, this transformation requires knowledge of causal and other kinds of relationships. By providing us with such knowledge, the sciences help us make better choices with regard to personal moral responsibility and collective solidarity, thus contributing to the realisation of everybody's right to a good life. Against this background, I now want to show why, in my opinion, pragmatic realism is not only philosophically preferable to metaphysical realism, but also does not tend to lead to intolerance.

Pragmatic realism does not lead to intolerance

I will do so by discussing what this talk of love and solidarity has to do with realism and the truth question. Concerning the truth question, it should be obvious by now why I cannot accept a correspondence conception of truth in the sense that truth is defined as a correspondence relation between judgements on reality and reality as it really is, irrespective of how we conceptualise it. Instead, I want to advocate a correspondence conception of truth that takes account of our human predicament in which reality, for us humans, is always conceptualised reality. Since reality offers resistance in different ways, empirically as well as existentially, truth claims can be of different character. I want to emphasise that we are dealing with the same concept of truth, i.e. that which has historically been called the formal, Aristotelian definition of truth, according to which a judgement is true if and only if it is the case as is maintained in the judgement. At the same time, however, it is about different substantial determinations of truth, depending on what kind of experience of resistance we are dealing with. Roughly speaking, it is about observational and existential experiences. The observational experiences are transformed, in the different sciences, into empirical knowledge of reality. The existential experiences of the inevitabilities of life are transformed, in the different views of life, into insights into what it means to be human. In the first case, a judgement is true if and only if it corresponds with how reality conceptualised by us offers resistance in our observational experiences. In the second case, a judgement is true if and only if it corresponds with how reality conceptualised by us offers resistance in our existential experiences.

Reflecting on truth in the pragmatically realist manner I have advocated in this paper requires freedom of science as well as freedom of views of life, whether religious or secular. The question of what is true when it comes to observational experience is a matter for the sciences to sort out between themselves. In that regard, science should be free from religious and other ideological interference. The issue of what is true when it comes to existential experience is a matter for the views of life to sort out between themselves. In that regard, views of life should be free from interference by advocates of scientism who claim that all problems,

including non-scientific moral and existential problems, can and must be solved by the sciences. By the way, it is obvious that scientism is not science but a view of life which can be criticised both from a scientific perspective, as going beyond what the sciences can achieve, and from the perspective of views of life, as being unreasonable, since moral and existential problems require another kind of solution than science can offer. Empirical knowledge is certainly relevant to the solution of moral and existential problems, but this is another matter.

The example shows that although there is a division between the function of the sciences in our life, on the one hand, and the function of religion and its secular counterparts, on the other, this does not prevent the sciences from being open to criticism by views of life – in situations when normative issues are reduced to empirical ones – nor does it prevent views of life from being open to criticism by the sciences – in situations when their claims contradict confirmed scientific explanations. In this regard, no sciences, not even high-status ones, and no views of life, not even one's own, can be claimed to be immune against criticism. Being aware of this makes one more tolerant.

Conclusion

I have shown that the metaphysically realist conception of truth implies that there can be only one true description of reality. The crucial presupposition is the idea that reality as such makes our judgements of reality either true or false. Since this approach leads to scepticism but we nevertheless have our sometimes very specific beliefs and convictions, the risk is that what is just one's own truth, knowledge or reality claims is dogmatically claimed to correspond with reality as it really is. The risk of intolerance becomes imminent. I have argued that the presupposed God's Eye point of view in metaphysical realism is not tenable. Instead, I have sketched a pragmatically realist conception of truth, the crucial presupposition of which is that reality for us humans is always conceptualised reality. Conceptually speaking, there is no possibility of exposing reality as it really is. Since we have different ways of coping with the resistance reality offers, in different kinds of experience, more

than one description of reality is needed. This means that different ways of justifying truth, knowledge and reality claims must be developed – by means of communication and cooperation which, in turn, presuppose that people are free to find out what theories are empirically adequate and what religion or secular ideology is existentially adequate.

The pragmatically realist conception of truth is an alternative to both dogmatism and relativism. In response to dogmatism, the pragmatic realist claims that no truth, knowledge or reality claim is privileged, and in response to relativism, he or she claims that the experienced resistance reality offers manifests that not all of our conceptualisations of reality are actually true to reality. First of all, this requires freedom of views of life, religious as well as secular, since religious conceptions, images and narratives are not existentially adequate for everybody; second, it requires freedom from scientism and its false claim that all problems, including existential and moral ones, can be solved by science alone; and third, it requires freedom of science since a good life presupposes not only existentially adequate conceptions, images and narratives but also empirical knowledge which cannot be provided by religions or their secular counterparts. As far as I can see, we can only achieve this if we give up metaphysical realism and accept a kind of naturalist and pragmatic realism as presented here. Such a change, I think, would provide us with a more prosperous way of discussing the relation between science and religion – more prosperous, since the discussions would be less focused on positions and more on problem-solving.

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Einstein said:

Reality is merely an illusion, albeit a very persistent one

But he also said:

When a man sits with a pretty girl for an hour, it seems like a minute. But let him sit on a hot stove for a minute – and it's longer than any hour. That's relativity.

A critical realist response

Kees van Kooten Niekerk

Introduction

In his paper Herrmann advocates a form of pragmatic realism. He does so in a critique of metaphysical realism, which he regards as philosophically untenable and, even worse, as tending to intolerance. Now, I advocate a form of critical realism, which presupposes metaphysical realism. Thus it would seem that I should be very critical of Herrmann's paper. However, this is not the case. On the contrary, when reading it I often found myself in agreement, sometimes even in happy agreement, with its ideas. How could this be?

The main reason is that Herrmann and I understand something different by metaphysical realism. Therefore I shall begin my response by explaining what I understand by it. As far as I can see my conception of metaphysical realism is in line with some key tenets of Herrmann's paper. That is why I could agree with him in so many respects. At the same time our presumed concordance offers a good point of departure for a comparison between his pragmatic realism and my critical realism. I shall make such a comparison with a special view to the relationship between science and religion.

Metaphysical realism

According to Herrmann metaphysical realism combines three theses:

(1) Things in reality have properties and stand in relation to each other independently of language and concepts;
(2) These properties and relations determine which judgments are true in the sense of corresponding with reality;
(3) There can only be one true description of reality.

Herrmann's main critique of metaphysical realism in this sense is that it has the consequence that we are not in a position to determine whether a judgment is true or false, because we have no access to reality in itself, independently of conceptualization. Therefore it leads to skepticism. To be sure, Herrmann sticks to the Aristotelian definition of truth as correspondence between a judgment about what is the case and 'what is really the case', as he puts it. However, following Tarski, he specifies the determination of truth with reference to rules for identification of an object and rules governing the use of general terms. Thus the formal concept of truth as correspondence is made manageable by linking it to procedures of identification and linguistic conventions. At the same time, this specification of the determination of truth opens up the possibility of different conceptions of truth dependent on different practices, e.g. science and religion. In this way Herrmann's pragmatic realism seeks to avoid the problems connected with what he regards as metaphysical realism.

Herrmann's definition of metaphysical realism is equal to Hilary Putnam's (Putnam 1981, 49; cf. Putnam 1992, 30), whom he mentions as a source of inspiration for his pragmatic realism. However, Putnam's definition is by no means generally accepted. A more common definition is given in The Cambridge Dictionary of Philosophy. Here metaphysical realism is defined as "the view that (a) there are real objects (usually the view is concerned with spatiotemporal objects), (b) they exist independently of our experience or knowledge of them, and (c) they have properties and enter into relations independently of the concepts with which we understand them or of the language with which we describe them" (Butchvarov, 1995, 488). This definition is more limited than Herrmann's, because it confines itself to his thesis (1).In my opinion it has the advantage that it only contains an ontological doctrine without mixing it up with epistemological ones, as does Herrmann's (and Putnam's).

I subscribe to metaphysical realism in the limited sense, as most philosophers do (cf. Butchvarov, 1995, 488).[17] I am rather sure that

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17 I have given some arguments for my subscribing to metaphysical realism in Niekerk, 1998, 52-55.

Herrmann subscribes to it too. For when he speaks of the resistance of reality, which may lead us to revise our conceptualization of it, the presupposition must be that there exists a reality that is independent of our knowledge of it and has its own characteristics. How else could it exercise resistance and make us change our conceptualizations? Thus I take it that Herrmann and I agree that metaphysical realism in the limited, ontological sense is true. If I am right in this I think we have an important common ground for further discussion.

Critical realism

Herrmann writes that he sympathises with critical realism. Yet he cannot accept it because of its metaphysically realist presuppositions. I agree with Herrmann that critical realism presupposes metaphysical realism, but only in the ontological sense defined above. Since Herrmann seems to accept metaphysical realism in this sense, the fact that it is a presupposition of critical realism need no longer prevent him from pursuing his sympathy. But of course he may have other reasons for rejecting critical realism. A comparison between critical realism and pragmatic realism will perhaps shed light on this. Before I make such a comparison I have to explain what I understand by critical realism and why I subscribe to it, at least with regard to science.

The term 'critical realism' is used as the designation of various views about the nature of knowledge. This is not the place to give an account of these views.[18] I confine myself to explaining what I understand by it. Generally speaking, critical realism is the view that it is possible to acquire knowledge of an external, mind-independent reality. That is why it is called realism. This view presupposes metaphysical realism in the ontological sense. The qualification critical distinguishes critical realism from so-called naive realism, which claims that external reality is as it is perceived. Critical realism recognizes that we have no direct access to this reality. Knowledge is always human knowledge,

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18 For such an account see my article 'Critical realism in theology and science' in *Encyclopedia of Sciences and Religions*, ed. Anne L.C. Runehov & Lluis Oviedo, Springer, forthcoming 2012.

dependent on the human mind. In this connection language is of crucial importance, because it is the principal medium for understanding. Our linguistic concepts both enable and limit our comprehension of the world. The recognition of the limits of our knowledge entails a critical attitude to the claim that it can 'mirror' external reality. Here critical realism is in line with Kant's critique of knowledge. Yet, unlike Kant, critical realism claims that it is possible to know something about reality as it is in itself.

Critical realism is especially relevant with respect to science. The reason is that modern science is characterized by a methodological openness to experience. I think of the central part played by rigorous empirical testing of hypotheses and theories, not least in the form of experiments. Einstein has characterized this testing as directing questions to nature, to which it mostly answers 'no' and only occasionally 'perhaps'. This may be an exaggeration, but it expresses an essential feature of science, namely that the subjective ideas of its practitioners are confronted with experience as an external authority, which often prompts them to revise their ideas until these have acquired a sufficient degree of empirical adequacy. By virtue of this method science has increasingly been successful in making us understand and predict natural processes and use them technologically.

A number of philosophers of science argue that this success can be explained best by the idea that empirically adequate scientific hypotheses and theories have a substantial realist bearing. This idea may give rise to a critical realist view of scientific knowledge, which accepts the realist explanation of the success of science but at the same time takes account of the mental and limited nature of all human knowledge. Then correspondence between scientific knowledge and reality is usually qualified as approximation. Stathis Psillos, for example, states that scientific realism "regards mature and predictively successful scientific theories as well-confirmed and approximately true of the world" (Psillos, 2002, xix).[19] I agree with Psillos, especially because I think that the success of science to a great extent is due to its methodological openness to experience. In my opinion, the corrective function of experience (its

[19]Psillos's 'scientific realism' can be regarded as critical realism applied to science.

'resistance', as Herrmann calls it) can only be explained satisfactorily as the result of a substantial input from nature.

I should like to add one remark. Usually critical realism is discussed with regard to scientific theories. Insofar as they postulate hypothetical entities (e.g. quarks), structures and processes to explain a manifold of natural phenomena, these theories are intellectual creations that may be far remote from the experiential world. In such cases it may be problematic to vindicate a realist bearing. We should not forget, however, that science is more than theories. Olaf Pedersen, the late Danish historian of science, has made a useful distinction between observation statements (reporting single events), statements of primary relations (e.g.: 'The specific gravity of lead is app. 11.4.') and scientific theories (Pedersen, 1988, 127). Especially with regard to statements of primary relations a strong case can be made for a critical realist interpretation: once established they almost always stand firm over time and it is hard to imagine that a number like 11.4 should be due to a hidden apriori of the human mind. The only reasonable explanation is that such statements correspond to characteristics of the external nature.[20]

Critical realism and pragmatic realism

On the basis of critical realism as I understand it I agree with Herrmann's pragmatic realism on three points:

First, Herrmann subscribes to the Aristotelian definition of truth as correspondence between a judgment and 'what is really the case', as he sometimes puts it. I agree with Herrmann on this definition of truth. The question is, however, what is meant by 'what is really the case'. Herrmann specifies it as 'conceptualised reality'. I agree with him insofar as this specification is a part of my understanding of correspondence.[21] At the same time, in a critical realist context I mean something more: a judgment's correspondence with conceptualized reality may at the same

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[20] A more detailed argument for critical realism with regard to science is given in Niekerk, 1998, 58-68.

[21] Cf. Niekerk, 1998, 55-57.

time be a correspondence with reality in itself, because there may be a kind of correspondence between our concepts and reality too. Here 'correspondence' should not be understood as 'mirroring', but, more loosely, as a match that tells us something about reality as it is in itself. Whilst Herrmann remains within the circle of conceptualization, I venture to transcend it in cases where I think that approximate correspondence with reality in itself offers the best explanation of our experience. I return to this point below.

Second, Herrmann emphasizes that our access to reality is mediated by language so that reality for us always is conceptualized reality. This view is in accordance with critical realism. As I have set out above the qualification 'critical' concerns the fact that our access to reality is mediated by the human mind and that this implies the recognition of the role of language in our understanding of reality. There may be a difference between Herrmann and me with regard to the exclusivity of linguistic access (doesn't feeling tell us something about reality too?), but no critical realist would deny the importance of conceptualization. In this connection it should be remarked that Herrmann has interesting things to say about the dependence of our conceptualization on human nature and shared social praxis. Critical realists can learn something from pragmatic realism on this point.

Third, Herrmann points to the resistance reality often exercises to our preconceived ideas, both in observational and existential experiences, and he proceeds by stating that this may make us realize that not all our conceptualizations are successful. Again, the critical realist agrees with this. As we have seen it is precisely this resistance, as for example expressed in Einstein's dictum that nature mostly answers 'no' and only occasionally 'perhaps', that provides the main argument in favor of critical realism. Both Herrmann and I recognize the phenomenon of reality's resistance. We differ, however, on the significance we attribute to this phenomenon. Hereby I have reached the point at which our ways part.

As to reality's resistance, Herrmann states that "the pragmatic realist can also maintain that reality is independent of us; however, this does not force the pragmatic realist to say anything about what reality is really like". I interpret this statement such that resistance justifies the assumption *that* there exists an independent reality (which is

metaphysical realism, as I have defined it), but that it does not convey any knowledge of *what* reality is (reality as it is in itself). The reason is, Herrmann continues, that reality as we know it always is *conceptualized* reality and therefore fundamentally contingent on various ways of human conceptualizing.

On this point critical realism differs from pragmatic realism. For a critical realist such as me reality's resistance (and the consequent success of science) not only shows *that* there is an independent reality, but also tells us something about *what* reality is like. The reason is that reality, conceptualized though it may be, again and again forces us to revise our conceptions. Now, Herrmann admits this, as we have seen. However, he leaves this fact unexplained. In the eyes of a critical realist this is unsatisfactory. The critical realist goes on to contend that we have a good explanation for this in the thesis that reality's own character gets through in our experience. How else could it be explained that the specific gravity of lead repeatedly turns out to be app. 11.4? Or how else could we explain the empirical success of quantum theory, regarding that it contains several counter-intuitive ideas? To be sure, the critical realists do not claim that the specific gravity of lead or quantum theory mirror reality as is it in itself. But they are bold enough to claim that there is a kind of correspondence. Otherwise it is incomprehensible that we should be able to acquire such empirically successful beliefs.

Herrmann blames critical realism for leading to skepticism, because it is impossible to make sure that our ideas mirror reality as it is in itself. However, critical realism does not assert the possibility of such an ideal correspondence. It makes do with the possibility of an approximate correspondence with reality in itself and thinks that this is sufficient to keep skepticism at bay. Rather, in the eyes of a critical realist Herrmann's pragmatic realism implies a kind of skepticism. To be sure, this realism enables its adherents to make a distinction between truth claims that are justified and truth claims that are not – because they meet resistance from conceptualized reality. In other words, it allows for the distinction between valid and invalid knowledge. However, this validity can never be more than a relative validity *within* the circle of human conceptualization, without reference to the character of reality in itself. With respect to reality in itself pragmatic realism is fundamentally

skeptical. Here critical realism is less skeptical, because it affirms the possibility of an approximate correspondence with reality in itself.

Religion and science

So far I have confined myself to discussing critical realism and pragmatic realism in connection with science. Now it is time to link the discussion with religion. Herrmann takes his point of departure in the concept of truth as correspondence between judgments and reality, which must be differentiated into different conceptions of truth, depending on different kinds of praxis and their concomitant conceptualizations. One such praxis is science, where truth consists in correspondence between theory and the observables, another religion, which is concerned with existential experience. It is the function of religion to provide a "view of life" consisting of "existentially adequate conceptions, images and narratives", which "may help people live with the inevitabilities of life by saying something true about what it means to be human".

I agree with Herrmann that religion is concerned with existential experience and that, at least among other things, it has the function to provide people with conceptions, etc. that may help them live with the inevitabilities of life. However, I have a problem with the specification "by saying something true about what it means to be human". The reason is that it suggests that this is the only way in which religion can fulfil its function. If this is what Herrmann means, I would point out that religion not only provides a view of life but also a ritual practice, which may be just as important as a view of life for living with the inevitabilities of life.[22] Moreover, the existential adequacy of a religious view of life is not merely dependent on its 'theoretical' truth, but also on its practical significance. Finally, as for the latter we must distinguish between significance for the religious person's *own* good life and moral significance, which, as Herrmann points out rightly, has to do with responsibility for the good life of *other* beings. Religion is a complex phenomenon and its adequacy should be judged by different criteria, not

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22 For the importance of ritual in religion, see for example Bellah, 2011.

only truth as correspondence between a religious life view and human existence. Now, this is hardly what Herrmann means. For example, he also states that "moral and existential problems require another kind of solution than science can offer". However, the problem is that, by making the Aristotelian concept of truth the overarching point of view, he can hardly avoid limiting the question of the existential adequacy of religion to the question of theoretical correspondence between religious life views and human existence. If this was not his intention, it would have been helpful if he had specified what other criteria for religious adequacy he thinks there are.

Against the background of what I have said about religion it should be clear that, in my eyes, critical realism can only have limited significance for religion. It can only have relevance in connection with a religious view of life, and only with regard to the cognitive aspects of this view of life. Let me exemplify this with a statement that expresses a central aspect of the Christian view of life: "Life is a gift from God". At least at face value this statement makes cognitive claims, say, that God has created human life and that he has created it such that it is worth living. Thus we have to do with a truth-conditioned proposition of which it makes sense to ask if it corresponds to reality. At the same time it is obvious that it is by no means easy to justify such a correspondence, even if we confine ourselves to the claim that life is worth living. This example may suffice to show that justification of critical realism for religious statements is not a straightforward matter. It cannot invoke something similar to the empirical success of science.[23] Therefore, if critical realism in connection with religion is a viable option at all, in my opinion it can only be a critical realism within the context of faith.[24]

Conclusion

Let me conclude with a few words about the relationship between religion and science. I think Herrmann is somewhat ambiguous on this

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[23] This has rightly been pointed out by McMullin, 1985.

[24] Cf. my argument in Niekerk 1998, 68-78.

point. On the one hand he says that the sciences and the religions have different functions in our lives and therefore cannot compete as to which can offer the true description of reality. He seeks the connection elsewhere, in the fact that, in the exercise of its moral function, religion should take account of scientific knowledge. This line of thought suggests that there is no cognitive, only an ethical connection between science and religion. On the other hand, however, Herrmann says that views of life, including religious ones, should be open to critique from the sciences when their claims contradict confirmed scientific explanations. Here the presupposition must be that there is a cognitive connection – otherwise it would be impossible to subject views of life to scientific critique. Now, whatever Herrmann's 'real' view, critical realism sides with the latter. To be sure, it recognizes that science and religion have different functions in our life, as has been illustrated by my specification of the complexity of religion above. However, this does not prevent religion from making cognitive claims. And even though these claims are quite different from scientific statements, they deal with one and the same world. Therefore they may be in harmony or conflict with one another. Here lies the background for a dialogue between science and religion on critical realist conditions. And it seems to me that Herrmann by his affirmation of the possibility of scientific critique of life views implicitly acknowledges the meaningfulness of such a dialogue, albeit on pragmatic realist conditions. If I am right in this, there exists agreement between us on this point too.

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Is this Tree of Life a God one could worship? Pray to? Fear? Probably not. But it did make the ivy twine and the sky so blue, so perhaps the song I love tells a truth after all. The Tree of Life is neither perfect nor infinite in space or time, but it is actual, and if it is not Anselm's "Being greater than which nothing can be conceived," it is surely a being that is greater than anything any of us will ever conceive of in detail worthy of its detail. Is something sacred? Yes, say I with Nietzsche. I could not pray to it, but I can stand in affirmation of its magnificence. "This world is sacred".

Daniel C. Dennett

The New Atheism in Denmark

Lars Sandbeck

Introduction

The emergence of the so called "New Atheism" seems first and foremost to have had its impact on the Anglo-American world. Since 2004 numerous atheist conferences, happenings, debates, and various other activities, have been organised in Britain and the United States. Alongside these activities readers in Britain and the US have witnessed the publication of a vast number of strongly atheist anti-religious books.[25]

The new atheists are proud despisers of "religion" – which they usually speak about in this generalising manner – and their ultimate hope is that religion one day will disappear from the face of the earth. Even though the new atheists present themselves as fearless adversaries of religion, I find it rather dubious whether their anti-religious publications actually merit the name of critique of religion. It seems to me that religion-bashing is a much more fitting description. The fine academic tradition of critique – whether literary critique, critique of religion etc. – requires a certain amount of knowledge about, and perhaps even a certain amount of respect towards, the subject one wishes to engage critically. But it is one of the uncontested characteristics of the new atheists that they are no experts in theology or the history of religion, and that they definitely do not want to pay any respect to any kind of religious faith. In contrast to criticism of religion, religion-bashing is an intellectually

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[25] See, for instance, Sam Harris, *The End of Faith* (2004), and *Letter to a Christian Nation* (2006); Richard Dawkins, *The God Delusion* (2006); Daniel Dennett: *Breaking the Spell* (2006); Christopher Hitchens, *god is not Great* (2007); Victor J. Stenger, *God: The Failed Hypothesis* (2007), and *The New Atheism* (2009); Russell Blackford and Udo Schuklenk (eds.), *50 Voices of Disbelief* (2009).

unchallenging activity. By and large it consists in the launching of a series of insulting jokes about religious people, like, for instance, that they represent an undeveloped, infantile species of the human race; that they are infected by a malicious and contagious virus; and that faith in God is no different than belief in the Tooth Fairy or the Flying Spaghetti Monster. As opposed to religion, atheism is often described as a token of mental health (for instance by Richard Dawkins), the atheist being an intelligent, independent grown-up, who doesn't need to cling to the religious delusion in order to live a prosperous and flourishing life. Two of the leading figures of the new atheist faction, Richard Dawkins and Daniel Dennett, have therefore founded 'The Bright Movement', an American atheist movement that allows the atheists to assume the convenient position of the victim by identifying themselves with the repressed homosexuals from 'The Gay Movement' of the 1980s.

In Denmark atheism in general and the new atheism in particular have not had a similar impact on recent public debates. However, several of the new atheist books have been translated into Danish, which has spawned some debate in the media, but not in academia. Furthermore, the two Danish atheist societies, Ateistisk Selskab (Atheist Society) and Humanistisk Samfund (Humanist Society), have proved very efficient in bringing public attention to their agendas. My aim in this essay is to provide a critical description of the Danish version of the new atheist movement. But before looking more closely into the Danish context, I find it necessary to start out with a general characterisation of the international atheist movement known as the "new atheism".

A Very General Description of the New Atheism

First of all, it is important to note that there is no specific organisation or tightly knotted network known as "the New Atheism". Rather, the new atheism is a *movement*, that is, a loosely knotted network, which consists of various local (or web-based) atheist societies and various individuals with very different backgrounds and aspirations. This movement appeared immediately after the terrorist attacks on New York and Washington DC September 9th 2001. A few days after these attacks,

Oxford professor of popular science, Richard Dawkins, published an article in *The Guardian* claiming that religion was to blame for the atrocities. Religion is like a weapon, Dawkins maintained, and to fill the world with religion "is like littering the streets with loaded guns. Do not be surprised if they are used" (Dawkins 2001). In the wake of the attacks Dawkins was widely praised for his statement, and other well-known commentators joined him in the accusation against religion.

However, the critique of religion partly initiated by the 9/11 attacks did not develop into a unified anti-religious organisation. Instead we have witnessed the appearance of various atheist books and activities, which are not very coordinated, or intelligently designed, but which often simply reflect the opinions and proclivities of various atheists who may, or may not, associate themselves with the new atheist movement. The great variety of recent atheist voices, of course, compromises any oversimplified talk about *the* new atheism. Nevertheless, it is still possible to point out several commonalities between the various atheist publications, which allow for a more general description of the new atheism.

In my general description I will take as my clue the motto from the website newatheism.org. This motto, it seems to me, beautifully encapsulates the central doctrines of the new atheism. The motto goes like this: "Intolerance of ignorance, myth and superstition; disregard for the tolerance of religion. Indoctrination of logic, reason and the advancement of a naturalistic worldview." In passing on to the interpretation of the text, let us casually note the doctrinaire confessional tone of the motto. For some reason, these new atheists find it relevant to confess their beliefs in a way that isn't all that different from what we would expect to find in most religious congregations. Nevertheless, the motto contains four creedal articles, two negative and two affirmative, to which I will now turn.

Intolerance of ignorance, myth and superstition

The first distinctive mark of the new atheism is its refusal to distinguish between faith and superstition, liberal religion and fundamentalism, religious faith and ignorance. All of these are by the new atheists indiscriminately classified as belonging to the same category of "things

we atheists don't like" or simply "religion". According to the new atheists, there really aren't any particularly good reasons to attempt to distinguish between different religious traditions, or between different traditions within the same religion, since all of them are based on the same delusion anyway, namely the delusion that "God" or some supernatural equivalent exists. One of the consequences of this unwillingness to distinguish between various kinds of religious faith is that the new atheists' rhetoric becomes full of exasperating over-generalisations. It is not merely creationism or radicalised Islam that "poisons everything" (see Hitchens 2007); no, the new atheists declare, it is "religion" as such that does that. It is rather like a dentist claiming that since one tooth is causing toothache, it is necessary to yank out the entire dentition.

Disregard for the tolerance of religion

The second negative doctrine reveals a more disturbing feature of the new atheism – its aversion to the tolerance and freedom of religion. The ideals of tolerance and freedom of religion, which are clearly stated in various human-rights declarations and in article 67 of the Danish constitution, are intended to secure the freedom of individuals to believe and practice whatever religion – or non-religion – they choose. According to the American new atheist Sam Harris the "very idea of religious tolerance – born of the notion that every human being should be free to believe whatever he wants about God – is one of the principal forces driving us toward the abyss" (Harris 2004, 14-15). A logical inference of such an observation would properly be to grant the secular states the power to make it criminal for its citizens to endorse certain beliefs. Not all of the new atheist protagonists are willing to go as far as Harris, but the disregard of the tolerance and respect of religion is nonetheless a feature common to most of them (see for instance Dawkins 2007, 306 et passim).

Indoctrination of logic and reason

It is somewhat puzzling that the new atheists are not dismissive of indoctrination as such, for one of Dawkins' frequently evoked accusations against religion is that the main reason for its transmission is

that small children are being indoctrinated by their religious parents (Dawkins 2007, 5); this, according to Dawkins, adds up to a severe kind of child abuse. But apparently it is entirely acceptable to indoctrinate people with logic and reason – even in the most restricted "scientist" sense of these words. Whatever we are to make of this obvious inconsistency, it is clear that the new atheists wish to take a stand for science and reason, and that – at least some of them – are willing to spread the good news of reason and science or logic by means of indoctrination.

Advancement of a naturalistic worldview

The new atheists are scientific naturalists, that is, they firmly believe that matter and energy – in a single word "nature" – is all there is, and that the natural sciences are the only effective means of achieving knowledge about anything. Therefore, sociology can be reduced to psychology; psychology to biology, biology to chemistry, and chemistry to physics. Intrinsic to a naturalistic worldview is the idea that life is ruled by blind, purposeless natural forces, for instance natural selection, which implies according to Dawkins that there is "no design, no purpose, no evil and no good, nothing but blind pitiless indifference" in the universe (Dawkins 1995, 133). This worldview is to be advanced – presumably through indoctrination? – to the whole human race. As it is based on a naturalist worldview, the new atheism represents a specific type of so called "evidential atheism" (Westphal 1993, 13). The main reason for not being religious, according to this type of atheism, is the apparent lack of any scientifically testable evidence for the existence of God. God is a hypothesis that lacks sufficient evidence to make it a reasonable explanation for any appearance in the world (Stenger 2007). Evidence is what makes a belief reasonable; but since belief in God is without evidence it is unreasonable and, hence, should be discarded. Evidential atheism is the natural outcome of a naturalistic worldview, which, on the one hand, privileges science as the best (or only) epistemological method, and, on the other hand, precludes references to any supernatural or transcendent reality.

The New Atheism in Denmark

I suppose that the Danish atheists that I associate with the new atheism would affirm the four doctrines mentioned above with no further reservations. It is difficult to know for sure, since none of the Danish atheists I am going to discuss in the following have produced any comprehensive books like those of the international new atheists. However, in some of the few recent Danish atheist publications we do encounter a rhetoric and an argumentation very similar to that of the Anglo-Saxon predecessors. Thus, for instance, in a very short essay printed in a "humanist anthology" the former associate professor in genetics, Erik Bahn, claims that science actually offers an explanation of the bewildering fact, that so many people keep on believing in "that religious nonsense" (Bahn 2007, 21). Science tells us, Bahn maintains, that religion is a product of our old, primitive reptile brain. Evolution predisposes us for a "dinosaur-god", a "living fossil", which is utterly irrelevant to our newly developed big brain. The good news, at least for atheists, is that they, in contrast to religious people, are "recently evolved mutants", whom nature has favoured and made into "independent free human beings" (Bahn 2007, 22). Atheists, one understands, are people with well functioning big brains, while religious people remain stuck with the old obsolete reptile brain. Another example of Danish new atheist literature might be biologist Lone Frank's populist book on neuroscience, in which she describes religion, among other things, as "an opportunist infection of our mental equipment" and as "a monstrosity emerging from the depths of the brain" (Frank 2007, 39 and 43).

Besides these few literary cases the main sources of the new atheism in Denmark are a substantial number of interviews and letters in various papers, plus the websites of various atheist societies. When looking into the activities and agendas of Danish atheists, two issues immediately come to mind: firstly, these atheists are engaged in a campaign to exclude any sort of religion from the public square; and, secondly, they work industriously to design atheist rituals in order to provide a non-religious alternative to the rituals of the National Church. I will now discuss these issues in turn.

Society without God

In Denmark some of the strongest endorsers of atheism are organised in various societies – the exact number of these societies remains uncertain. The two largest and most influential of these are Ateistisk Selskab and Humanistisk Samfund. Judged solely on the basis of the numbers of membership it would be an exaggeration to claim that these societies for the moment are very successful. Compared to the Norwegian atheist society, Human-Etisk Forbund, which counts more than 75.000 members, Ateistisk Selskab and Humanistisk Samfund are almost insignificantly small, counting only about 1000 and 500 members respectively. The general population, whether secular or religious, continues to belong to the Danish National Church, which currently has about 4 million members or about 80 percent of the population. In regard to these numbers, the atheist societies must be said to represent a very small minority of the population. However, they have often skilfully been able to create headlines in the media and influence the public debate. So, shortage of membership and popular support does not necessarily mean a shortage of interest.

For a foreign observer it may seem very odd that atheists in the Scandinavian countries complain about the presence of religion in public. According to a recent survey, Denmark and Sweden are two of the most secular countries in the world; they are almost already "societies without God" (Zuckerman 2008). Today, Denmark must be regarded as a post-Christian society in the sense that Christianity has ceased to be a formative, cultural factor. Danish society would most likely look very different today if the Christian religion had not been the main cultural force since the ninth century, but the inspiration to the ongoing formation of Danish society in the present has many other sources – e.g., nationalism, Enlightenment values, socialism etc. The post-Christian condition reveals itself in various, perhaps somewhat trivial, forms: people in general no longer believe in the Christian doctrines; they do not go to church, except on certain occasions like Christmas and weddings; the pastor is hardly regarded as an authority anymore; the spiritual or religious attitudes of the citizens are considered to be private matters; the religious or non-religious positions of politicians are completely irrelevant to the voters etc. The population continues to maintain a few

Christian traditions, but in reality Denmark is a meticulously secularised society. Atheism and secularism have been victorious to the degree of reducing Christianity to a symbolic and cultural heritage that only a small handful of people take seriously as a source of orientation and elucidation of life. The National Church and its employees don't have any more political influence than any regular voter, and its economic privileges are almost insignificant. The pastor was once an authority who could instruct the population in everything from the salvation of the soul to the cultivation of the soil; today the pastor is largely an administrator of rituals who is needed in order to make the family occasion more festive. The common population knows almost nothing about Christianity and is therefore inclined to take 'The Da Vinci Code' for granted as the historical truth about Jesus. The white cross in the national flag is hardly noticed by anyone anymore, and it might as well have been a line, a number, or an x. Of course, some people still believe in God, but in practice Danes are all atheists. In other words: the Christian period is over.

Accordingly, there is really not much for the Danish atheists to fight against anymore. This is presumably one of the reasons why the atheist societies appear rather comical when they continuously complain about the presence of too much religion in the public square in Denmark. A main target for Danish atheists is, of course, the National Church. One of the central concerns of, not least, Ateistisk Selskab is to accomplish a complete separation between state and Church. From a principled point of view this might seem sound enough. And one must at the very least grant to the atheists that there certainly are some economical issues that need to be taken care of in regard to the National Church. For instance, it doesn't seem particularly fair that non-members are forced to contribute economically to the National Church through the taxes that are paying the salaries of the pastors. However, aside from this economic favouritism, it might be argued from a democratic perspective that it is only fair that an institution which is backed by among 80 percent of a given population is given certain privileges over against other religious or non-religious associations.

When looking more closely into some of the cases that the Danish atheists have been promoting, it becomes evident that it is not merely the National Church that is targeted but religion in the public square as such.

Cases are numerous and often rather trivial. Let me present two examples *instar omnium*. The first one presents a rather extreme case. Around Christmas 2008, a spokesman of Humanistisk Samfund, Dennis Nørmark, complained about the present calendar system, which forces people to adjust their life in accordance to various "holy seasons" that are based on "superstitious ideas" (Politiken December 20th 2008). According to Nørmark, such a calendar is utterly improper to "modern life" because it "troubles the citizens with religion in their everyday life." Nørmark therefore suggested a rationalisation of the calendar: the Christmas holyday, for instance, should in the future be called "family vacation" and Easter renamed "spring vacation". If such calendar alterations were implemented, Nørmark's argument went, Danish society would be better adjusted to modern life; a life, one understands, with no room for any public manifestations of religion – not even manifestations as trivial as names on a calendar.

The second case concerns the debate in the spring of 2009 that arouse when a few parents began complaining about the tradition in a small handful of public schools of reciting The Lord's Prayer at their morning assemblies. Shortly after New Year's Eve, a parent on Houlkærskolen in Viborg made contact with Humanistisk Samfund complaining about the practice of that school of letting the pupils say The Lord's Prayer during the daily morning assemblies. According to Humanistisk Samfund's representative Erik Bartram Jensen's public comment this practice is nothing less than "an assault on small children" (Kristeligt Dagblad January 3rd 2009). A few days later another parent complained to Humanistisk Samfund. Now it was the mother of a pupil at Nørre Nissum Skole in Lemvig who felt offended by the daily "assaults" against her son. Jensen now argued that it is "offensive and a complete lack of respect" for non-believers if they and their children are exposed to religion in that manner: "it puts psychological pressure on those children who do not want to say The Lord's Prayer" (Kristeligt Dagblad January 6th 2009). The inspectors from the two schools in question explained that the reciting of The Lord's Prayer at the morning assemblies wasn't meant to cause offence, neither was it an attempt to advance the Christian faith; it was merely an old tradition with a cultural pedagogical purpose. Moreover, Jens Jørgen Porup from Nørre Nissum Skole referred to the Danish legislation, which states that it is up to

individual school leaders to decide whether The Lord's Prayer is to be recited or not.

This appeal to the legislation didn't satisfy the atheists from Humanistisk Samfund. Instead they attempted to escalate the conflict by appealing to the spokespersons of education from the different political parties, the president of school leaders, and the president of the parent organisation. These officials, however, almost unanimously agreed that the case wasn't grave enough for them to deal with. The ambitious objective of the complaints that Humanistisk Samfund directed to the official representatives was to achieve an amendment which would disallow any recitation of The Lord's Prayer in public schools. In the meantime, Houlkærskolen in Viborg had initiated a sober and democratic hearing among its parents, pupils, and teachers. If the general opinion was in favour of preserving the tradition of reciting The Lord's Prayer the school would continue that practice, since, according to the president of the school board, Ole Trier Nørskov, "it is neither Humanistisk Samfund nor a solitary parent who are to decide what is going on at Houlkærskolen" (Kristeligt Dagblad February 18th 2009). This democratic procedure and willingness to engage with the opinions of those actually involved didn't affect the atheists of Humanistisk Samfund: instead they simply chose to submit a complaint letter to the municipalities.

The whole case about The Lord's Prayer in public schools suggests itself as a telling example of the way the Danish atheists have been combating religion in recent years. They appeal to offended feelings instead of arguments; they ignore the initiative of others to engage in serious dialogue; and they attempt to influence politicians and other officials to assume a more hostile approach towards religion. As already mentioned, the atheist societies are not simply opposing the contemporary institution of the National Church; they attack religion as such and want to exclude it from the public. In connection to the case about The Lord's Supper, Ateistisk Selskab published a press announcement on their website stating that "religion and associated religious practices should be something one as an individual has to choose – it should not be something one has to positively reject in the public square." This is the way, the announcement continues, "freedom of religion functions in practice". It seems that according to Ateistisk

Selskab's representatives freedom of religion implies that one should never really be exposed to or confronted by religion or religious practices in public at all. The principle of freedom of religion is here being interpreted in a way that comes closer to meaning freedom *from* religion. One gets the impression that the new atheists in Denmark want an atheist state that maintains a public exclusion of religion: religious symbols, utterances, and practices are to be kept inside in the private sphere. If this is correct, it looks as if the new atheists are not content with Denmark being a secular society; rather, they would prefer it to be an atheist or anti-religious society (Gey 2007).

Atheist Rituals

One of the more curious features of recent atheism in Denmark is the attempt of atheist societies to design atheist or secular rituals.[26] Intuitively such attempts might seem self-contradictory because rituals and ritualised activities are mainly associated with religious practices. Yet, if one endorses a wider description rituals may also be very profane activities like, for instance, singing at a football match or dancing at a party. But remarkably enough Ateistisk Selskab and Humantisk Samfund want to develop atheist rituals in relation to the naming of the child, the transition from child to adult, and marriage and death. These rituals, of course, coincide with the four major rituals of the church: baptism, confirmation, wedding, and funeral. The occasions that correspond to these rituals are, perhaps, universally considered to be natural transitory events of life. Every human being, notwithstanding a small number of tragic exceptions, is born, grows up and dies; and throughout the history of the human race marriage seems to be universally accepted as the most efficient method of instituting the family. But from these trite facts it does not necessarily follow that we as humans are ontologically predestined to employ rituals to mark out these occasions. If atheists were indeed "recently evolved mutants", whom nature had favoured and made into "independent free human beings", as Erik Bahn claimed, then one would certainly expect that atheists, of all people, would be able to

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26 For a critique of the Danish atheists' ritual designing activity, see (Christiansen and Sandbeck 2009, 45-66).

break free of these bio-sociological impediments. If you are really free, why, then, would you need to follow in the footsteps of previous generations? And why, if you are a free atheist, would you want to imitate the ritual practices of a religious institution? There are presumably two answers to that question: the Danish atheists want to design atheist rituals firstly for strategic reasons and, secondly, for psychological reasons.

The strategic reason relates to the new atheists' battle against the National Church. By offering non-religious alternatives to the rituals of the church, the atheists are attempting to hijack the large group of so called "four wheel Christians", that is, the vast majority of members of the National Church who only attend church at Christmas, baptisms, weddings, and funerals (Jensen 1995). Maybe it would be more fitting to speak about "five wheel Christians", because a great many also attend confirmations. In any case, the point is that Danish atheist societies want to hijack members. Jonathan Szpirt from Ateistisk Selskab confirmed the strategy in an interview: "we want to offer the same range of products as the communities of believers in order to present an alternative to those who don't believe in a god or religious power." (Kristeligt Dagblad July 8th 2008). Ateistisk Selskab are therefore going hunting for the "economical members" of the National Church, that is, the "four wheel Christians" who represent the group of members that are not "serious" believers, but who nonetheless continue to pay church taxes in order to be able to make use of the church's services. In other words, Ateistisk Selskab wants their share of the market. The "serious believers", those who, so to speak, buy the entire religious package, are most likely beyond the reach of the atheist campaign; the "economical members", in contrast, are potential clients, Szpirt claimed. Thus, Ateistisk Selskab wants to "educate their own masters of ceremonies who can conduct the new rituals, and who can offer counselling and expertise."

The psychological reasons are more complex. We may ask: why do naturalist atheists, who by definition don't believe in gods or other supernatural powers, who only believe in "objective" reality and in what can be investigated scientifically, why do these atheists have the need of rituals? Is it simply for sociological reasons, e.g., to strengthen the sense of community in the atheist societies? Or maybe the atheist rituals are only being invented for strategic purposes? In a comment in Politiken

(Martz 20th 2009) Dennis Nørmark from Humanistisk Samfund pointed toward another, more psychological reason in regard to the coming atheist wedding ritual. According to Nørmark, it is a very inadequate experience for atheists when – because they don't want to be married in a church – have to be married at the town hall where all they receive is a "congratulation from the municipality." The municipality, Nørmark further describes as "an empty legal institution", and he then continues: "We [: atheists] like everybody else want the events of our life be celebrated as something larger and more meaningful." Please note how Nørmark in these few lines effectively contrasts "an empty legal institution" with "something larger and more meaningful."

The interesting question is, of course, what in an atheist's universe might count as something larger and more meaningful than "an empty legal institution"? Which higher or larger powers (institutions, beings, energies etc.) may the atheists invoke in order to implement the sense of something larger and more meaningful during the performance of the ritual? The obvious answer is, of course: none! All we have is the legislation which is made up by humans, and which the municipality administrates. For religious people, who believe in God, there obviously exists a non-municipal being that may be invoked during the ritual; hence, religious people are able to celebrate the events of their life as something larger and more meaningful because the events get filled with a kind of sacred aura when the transcendent in and through the ritual is drawn into the immanent plane of everyday life. Apparently, the atheists from Humanistisk Samfund also have a psychological need for the invocation of a meaning larger than what the individual is capable of producing her-/himself. This need is, it seems to me, utterly inconsistent with the naturalistic worldview that is commonly endorsed by new atheists. If naturalism is true, then there is in the universe "no design, no purpose, no evil and no good, nothing but blind pitiless indifference" (Dawkins 1995, 133). Such a worldview would, of course, affect the question of meaning too. Here is what Darwinian naturalism has to say about meaning, according to Janet Browne: "Where most men and women generally believed in some kind of design in nature – some kind of plan and order – and felt a deep-seated, mostly inexpressible belief that their existence had meaning, Darwin wanted them to see all life as empty of any divine purpose" (Browne 1995, 542). If naturalism

excludes meaning from existence, thus stressing the blind pitiless indifference of being, how, then, are we to understand a naturalistic atheist's need for something larger and more meaningful?

The Danish atheists' need for rituals as a means of celebrating certain life events as something larger and more meaningful is, I maintain, interpretable as an example of fetish religiosity. A fetish is an object or a "thing" (in a broad sense) that enables the one clinging to it to rationally accept the traumatic loss of someone/something (see Žižek 2001, 13ff.). The meaning and significance of what one has lost is transferred to the fetish object, so that one on a very unconscious level still experiences that meaning and significance. On a conscious, rational level one fully accepts the loss and may even talk about it unaffectedly – because one clings to the fetish. But if the fetish dies/gets destroyed the world collapses and the trauma begins to dominate.

It is hard not to view the atheists' ritual designing activity as some sort of fetish. These atheists are, on one level, able to accept very rationally the loss of meaning (God) that their naturalistic atheist worldview provokes. But the ritual fetish grants the atheists access to something larger and more meaningful without reference to the lost object/meaning/God that is the logical precondition of such a claim for meaningfulness in the first place. There is no meaning, no purpose, nothing but blind indifference in the universe, the naturalistic atheists claim unaffectedly, almost apathetically – but in the ritual they keep on experiencing something larger and more meaningful. Take away their rituals, and watch their world collapse.

Closure

Allow me to close this essay on a more personal note. A year ago I was asked to give a lecture at Ateistisk Selskab in Copenhagen. In the subsequent discussion with the about 50 attendants I realised how strongly these atheists despise religion and the National Church. To them it is an outright provocation that religion is still around, and they truly and honestly believe that Danish society is not secular enough. Hatred is a strong word to use, but I think it appropriate to characterise these

atheists' attitude towards religion as a deeply passionate loathing. They not merely think that religion is stupid and wrong, they actually hate it. I kind of suspected that in advance, but I was nevertheless surprised by the measure of their hostility – not towards me, but towards religion. But what really surprised me was that the strongest reaction against my lecture concerned what I had said about their ritual designing project. Clearly, I had here walked right into a minefield. Again and again I was told that it was rude and offensive to criticise what they were doing, and that I should accept that they – as everybody else – want to celebrate marriage or non-firmation or whatever. Some of them even told me to leave them (or rather their rituals) alone and to mind my own business. I am not proud to admit it, but in some sick and perverted way I was deeply satisfied with these powerful emotional reactions. Not only did they confirm me in my suspicion that the rituals they were so protective of functioned very much like a fetish. Their reactions also reminded me of how obnoxiously difficult it is for us human beings to face up to the terrors of an entirely meaningless universe. We may affirm meaninglessness in theory, but in our practices we tend to smuggle back meaning through the backdoor.

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Three Neoatheistic Arguments. A Critique

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Introduction

The present article will deal with some lines of thought which have been of significance in contemporary neoatheism. I shall focus my attention on three different arguments, all of which claim that *natural science refutes certain religious belief.* A shorthand formulation of these three arguments could be made in the following way.

1. The biological theory of evolution shows that supernatural/theistic explanations of the world are untenable.
2. Neurophysiological theories show that "we are nothing but neurons".
3. Physical theories show that matter is the ultimate stuff of reality.

1, 2 and 3 may also be based on philosophical, metaphysical or ethical considerations. Such arguments will not be discussed in the present context. Needless to say, the distinction between natural science, on the one hand and philosophy, metaphysics and ethics, on the other hand, is not perfectly clear. But this will not be a great problem in the present context. I am interested in *claims* to the end that natural science refutes central religious beliefs. Whether or not these claims are "contaminated" by philosophy, metaphysics and/or ethics is one or another matter.

The first argument is influential in the writings of Richard Dawkins. The second argument has been elaborated mainly by Steven Pinker. And the third can be found in works of Daniel Dennett. In turn these writers have influenced neoatheism in Sweden, but I will not digress into a study of how this process has evolved and what particular shape and form these arguments have taken in the Swedish context. However, one observation is of significance.

In Sweden, 1, 2, and 3, have been publicly advanced and supported by members of the Swedish Humanist Association. They have also been addressed in some academic publications, which address these arguments (for example, Stenmark 2001, Runehov 2007, Bråkenhielm & Fagerström 2007, and Jonsson 2008), but the critical remarks made in these publications have not received much attention from Swedish neoatheists. Surely, there has been a lot of public debate between neoatheists and their opponents. But this debate has almost without exception taken the form of a confessional dialogue, where each partner has witnessed about his or her own convictions. There is almost no example of at truth-seeking dialogue with an emphasis on mutual understanding and attention to the basic methodological principles of the dialogue (Hick 1977). I will refrain from any speculation about the reasons for this situation and instead concentrate on the main theoretical ideas and the claim that these ideas are supported by natural science.

There is one particular argument frequently advanced by neoatheists, which will not be addressed in the present context. It is the argument that scientific *explanations* of belief in God (such as Marxist, Freudian or evolutionary arguments) show that it is false that God exists. This is a vast topic, but a large part of the area is addressed by Daniel Dennett´s notice "that it could be true that God exists, that God indeed is the intelligent, conscious, loving creator of us all, and yet *still* religion itself, as a complex set of phenomena, is a perfectly natural phenomenon" (Dennett 2006: 25). Of course, it may still be questioned (as it seems to be by Dennett himself in Dennett 2007: 147 f.), but this is a too broad and deep problem in the present context.

The theory of evolution and the belief in God creation

One of the basic tenets of neoatheistic humanism is that evolution is incompatible with a Christian belief in creation. This is in line with a significant part of the general public. In a survey of 2006 the following proposition was presented to a representative sample of the Swedish population:

Christian belief in creation is incompatible with the biological doctrine of evolution.

Needless to say, "Christian belief in creation" is a general and vague expression that may be interpreted in many different ways. The intention of the survey was not to map the public perception of Christian belief, but to reveal to what degree this belief was perceived as being incompatible with Christian belief. 27 % agreed completely or partially. Moreover, about 40% of urban men believed that evolution was incompatible with the Christian belief in creation.

The theory of evolution may be claimed to be incompatible with the Christian belief in creation for several reasons. One common reason is based on a particular interpretation of this Christian belief in the world as a creation of God, i.e. that it is synonymous with the claim that God created all life on earth at a particular time by a special and direct intervention. The different species were fixed and ready from the beginning. A certain form of evolution may have occurred *within* these respective species. But the different species are what they are "from the beginning". This type of understanding is commonly called *creationism*.

Creationism can be relaxed in various ways. One could, for example, assume that life development has proceeded according to the classical theory of evolution, but that the first cell or the first human/human pair was created at a particular time by a special divine intervention. At a special occasion God selected a naturally arising primate of the genus Homo and breathed the "breath of life" into this being (Gen. 2:7). However, this is not creationism in the strict sense; rather it is one version of the idea of *intelligent design (ID)*. It may be based on divine revelation or on some form of natural theology.

Either way, neo-atheists in general have raised serious – and to my mind valid – objections against strict creationism and ID. I will not go into the specifics of this critique but focus on the more general background theory for some of the versions of strict creationism and ID based on natural theology, namely the Argument from Design in the form proposed by William Paley in his *Natural Theology* (1802). Paley begins his book in the following way.

> IN crossing a heath, suppose I pitched my foot against a *stone*, and were asked how the stone came to be there; I might possibly answer, that, for any thing I knew to the contrary, it had lain there forever: nor would it perhaps be very easy to show the absurdity of this answer. But suppose I had found a *watch* upon the ground, and it should be inquired how the watch happened to be in that place; I should hardly think of the answer which I had before given, that, for any thing I knew, the watch might have always been there. Yet why should not this answer serve for the watch as well as for the stone?

Essential to Paley´s answer is the structural difference between object such as the watch and objects such as the stone is that objects such as the watch have a (1) goal-directed structure (i.e. consisting of smaller parts in an intricate interaction for a specific end) and (2) a designer. Now, central in Paley´s argument is the claim that there is an analogy between things with a goal-directed structure (such as clocks, cars and computers) and certain natural objects (such as the human body, the solar system and the living cell). On the basis of this analogy Paley concluded that natural objects with a goal-directed structure must have a designer. And he identified this designer with God.

David Hume in his *Dialogues concerning natural Religion* (Hume 1779, 1945) raised serious objection against this line of thought. I will not reiterate those well-known arguments in the present context, but focus upon the argument which Richard Dawkins added. In essence, Dawkins argued that evolutionary theory provides us with a better

explanation of natural objects with a goal-directed structure than that these objects are created by God. And the alternative explanation is (roughly) that they emerged through natural selection acting on randomly mutating organisms. Paley´s Argument from Design was definitely and finally refuted by the theory of evolution. Moreover, " […] Darwin made it possible to be an intellectually fulfiled atheist" (Dawkins 1991: 7).

Dawkins´ claim has been interpreted in different ways. There is the possibility that Dawkins means that there are many arguments against belief in God, but that evolutionary theory – as it were – tipped the balance in favour of atheism. But the context of his argument in *The Blind Watchmaker* makes a stronger interpretation more reasonable: evolutionary theory provides us with conclusive evidence that it is false that God exists.

There are many weaknesses in this line of thought. First, Dawkins´ argument is an argument of the second order, namely an argument against an argument – albeit one of the more influential – for belief in God. It is possible that there are other arguments for belief in God or that believers are justified to believe in God even if the Argument from Design is a failure. One failed argument is not the end of the story. Secondly, it is a matter of serious doubt if evolutionary theory refutes the Argument of Design. I think that the Argument from Design is a failure and that this has been shown by David Hume. But it is wrong to think that it has been refuted by Charles Darwin. Take one simple example: the first living organism, which is a paradigm example of a natural object with a goal-directed structure. It consists of many different parts that are linked together in an intricate system with the end to replicate itself. It emerged out of non-organic material, and cannot be explained by evolutionary theory. Yet it is a paradigm example of a natural object with a goal-directed structure. (See further Jeffner 1966: 23 f.)

Needless to say, the conclusion of these arguments is not that theism is justified. The conclusion is that Dawkins´ argument against theism are inconclusive. However, there are other arguments against theism that need to be considered – especially against the particular form of theism that Dawkins focuses on in *The God Delusion* (2006), namely empirical theism. Empirical theism is – to put is simply – the idea that the existence of God is a scientific hypothesis. In a later publication, Dawkins claims that belief in God is a scientific hypothesis:

> God´s existence and non-existence is a scientific fact about the universe, discoverable in principle if not in practice. If he existed and chose to reveal it, God himself could clinch the argument, noisily and unequivocally, in his favour. And even if God´s existence is never proved or disproved with certainty one way or the other, available evidence and reasoning may yield an estimate of probability far from 50 per cent. (Dawkins 2006: 50)

William Paley and Richard Dawkins disagree on the probability of the existence of God. Paley relies on the analogy between goal-directed and natural objects and claims that this makes the existence of God highly probable. Dawkins position is that "I cannot know for certain, but I think God is very improbable, and live my life on the assumption that he is not" (Dawkins 2006: 50-51). But this disagreement hides a deeper sympathy. Paley and Dawkins share the same point of departure – the existence of God is a scientific hypothesis. Or to put it more precisely; *those who affirm belief in God, should give reasons for their affirmation which are of the same kind as those given in empirical science* (see Jeffner 1966: 25 f.). This could be described as the central tenet of empirical theism. But why should we believe that this central tenet of empirical theism should be accepted?

There are many arguments in favour of interpreting belief in God in the form of a scientific affirmation. Empirical theism subjects religious belief to the stringent canons of science. It has the methodological advantage of providing us with tools to solve the issue and not content ourselves with a lukewarm agnosticism. And – more importantly – it has been claimed that empirical theism is also in line with the way religious persons understand their faith. The most famous example is the Old

testament-story of Elia and the Prophets of Baal. Elia had a hypothesis about God and to verify it he sets up an experiment:

> Elijah went before the people and said, "How long will you waver between two opinions? If the Lord is God, follow him; but if Baal is God, follow him." But the people said nothing. Then Elijah said to them, "I am the only one of the Lord's prophets left, but Baal has four hundred and fifty prophets. Get two bulls for us. Let them choose one for themselves, and let them cut it into pieces and put it on the wood but not set fire to it. I will prepare the other bull and put it on the wood but not set fire to it. Then you call on the name of your god, and I will call on the name of the Lord. The god who answers by fire—he is God. "Then all the people said, "What you say is good. (1 Book of Kings 18.21-24)

We all know the result of the experiment; the hypothesis of Elia was verified. In essence, the procedure is in accordance with the basic tenet of empirical theism. William Paley and Richard Swinburne (to take an example from contemporary philosophy of religion) would not go for such an experiment, but basically they would argue from nature to God as St. Paul did against the heathens in his Letter to the Romans:

> For the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made, even

> his eternal power and Godhead; so that they are without excuse. Because that, when they knew God, they glorified him not as God, neither were thankful; but became vain in their imaginations, and their foolish heart was darkened. Professing themselves to be wise, they became fools. (Romans 1:20-21)

In fact however, St. Paul was wrong. "for the unprejudiced know that the heavens are quite silent about the glory of God, and that the firmament displays nothing of his handiwork" (van Inwagen 2006: 135). More clearly than ever, this problem of divine hiddenness is expresses in the dialogue between the Knight and Death at their famous chess play in Ingemar Bergman´s *The Seventh Seal* (1957):

Knight: Why can´t I kill God within me? Why does he live on in this painful and humiliating way even though I curse him and want to tear him out of my heart? Why, in spite of everything, is He a baffling reality that I can´t shake off? Do you hear me?

Death: Yes, I hear you.

Knight: I want knowledge, not faith, not suppositions, but knowledge. I want God to stretch out His hand to me, reveal Himself and speak to me.

Death: But He is silent.
(from the Script of The Seventh Seal)

The problem of divine hiddenness is a stumbling block for empirical theism. Religious faith does not (pace Elijah) appear as a scientific hypothesis in the lives and reasoning of most religious believers. In religion it is praiseworthy, to stand fast to your belief come what may. This is an attitude which is foreign to the spirit of science. Moreover, the God of empirical theism appears as a thing in the world. This is radically

at odds with basic experiences of transcendence common in all religious traditions. There is also the problem of translating religious metaphors and stories into clear and verifiable scientific hypotheses. This has been tried all through Western history, but it can be argued that something of utter importance is lost in these translations.

My tentative conclusion is, therefore, that empirical theism fails as a way to understand religious belief. Religious belief – at least in the form it appears in Jewry, Christianity and Islam – is more appropriately construed as a non-scientific hypothesis about reality as a whole. This comes close to John Hick and his argument in *An Interpretation of Religion* (1989). Religious beliefs are appropriately termed, non-scientific, because they are hypotheses about a systematically ambiguous reality. It is like an ambiguous situation, which admits many different interpretations – and none of them can conclusively be deemed justified according to canons of science or common sense. Hick writes:

> It seems, then, that the universe maintains its inscrutable ambiguity. In some respects it invites whilst in others it repels a religious response. It permits both a religious and a naturalistic faith, but haunted in each case by a contrary possibility that can never be exorcised. And realistic analysis of religious belief and experience, and any realistic defence of the rationality of religious conviction, must therefore start from this situation of systematic ambiguity. (Hick 1991: 124. See also Jeffner 1972: chap. 6.)

If this position is correct, then empirical theism fails as an appropriate understanding of religious belief. And if empirical theism fails so do the efforts to show that scientific evidence is that which ultimately makes religious beliefs rational or irrational.

One last qualification needs to be added. There are, clearly, religious affirmations, which unambiguously contradict strongly established scientific evidence. One example is the central tenet of creationism that all living organism were the result of an instantaneous creation God at a specific point in history and that none of these organisms have developed out of another organism in small intermediary steps. Such beliefs cannot be rationally justified, nor can any other that fly in the face of scientific evidence. (In a more technical language: the idea of religious belief as a non-empirical hypothesis should be combined with the idea of the primacy of empirically based knowledge. See Jeffner 1999: 22.) At the other end we have beliefs that are clearly beyond science, such as the belief in the eternal existence of God. But there is also an intermediary zone of beliefs which – pending on particular interpretations of science – may come into conflict with science, but for which it could be argued that this is not the case. It is a matter on continuing scholarly debate. This is the case with certain stories of miracles. In most cases there is overwhelming evidence that these stories are fabricated or simply false, but there are also cases which resist definitive falsification by science - save the falsification in principle that no miracles (in the sense of a violation of a natural law) occur. There is much more to be said about this, but here I must be content to leave the subject.

You are nothing but a bunch of neurons!

Steven Pinker and others have argued that there is another part of the Christian belief in creation, which is contrary to science, namely the notion that human beings have a soul (Pinker 2002: 1-2). This idea is not a part of original Jewish religion (and perhaps not even of the New Testament), but it has become an integral part of a dominant tradition within Christianity. The soul is the seat of our moral sense, our ability to love, our intellectual capacity and ability to decide how we should act. Furthermore, it persists after the body is gone. Steven Pinker believes that such an understanding of human nature is completely untenable.

Pinker refers inter alia to Francis Crick, who discovered DNA molecule together with James Watson in 1953. In 1994 Francis Crick

published a book with the title *The Astonishing Hypothesis* about the revolutionary idea that

> [y]ou, your joys and your sorrow, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules. As Lewis Caroll's Alice might have phrased it, 'You're nothing but a pack of neurons' (Crick 1994: 3)

One would think that there is a difference between (1) the claim that consciousness is nothing but neurons and their activity and (2) the claim that neurological activity in the brain is not identical with, but *gives rise* to consciousness. But this distinction matters less to Pinker. "The evidence is overwhelming that every aspect of our mental lives are entirely determined by physiological processes in the tissues of the brain." One page later he adds that "cognitive neuroscience is showing that the self, too, is just another network of the brain systems" (Pinker 2002: 41, 42).

"You are nothing but a bunch of neurons". This means that emotional and mental processes - thoughts, feelings, desires, decisions, etc. - are nothing but neurological processes in the brain. Furthermore, Pinker claims that neurology has given us reliable knowledge about these processes and how they should be described and explained. "Beliefs and memories are collections of information like facts in a data base, but residing in patterns of activity and structure in the brain" (Pinker 2002: 32). The brain is certainly far more complex than a digital computer, but it works along the same basic principles, i.e. according to data processing principles. The brain processes information from the senses in the same way as a computer processes data. Our computers serve as information processing tools. The incoming information is reduced to ones and zeros and processed with incredible speed under a particular program and reaches a certain result in the form of an image, a text or a number. It was

Alan Turing, who as early as the 1930s described the data processing fundamentals and gave us the foundation of modern computer technology. He also gave rise to the computational theory of mind. In essence, a computer is similar to our brain except for the fact that a computer carries out information processing incredibly faster than the human brain. Furthermore, the human brain processes the information we receive through our senses with the help of other programs than our computers. This is the difference. Nevertheless - Pinker writes - it is perhaps less different than we imagine. “Recent artificial intelligence systems have written credible short stories, composed convincing Mozart-like symphonies, drawn appealing pictures of people and landscapes and conceived clever ideas for advertisements” (Pinker 2002, p. 34).

The Swedish biologist Torbjörn Fagerström has argued against the uniqueness of the human being (Bråkenhielm & Fagerström 2007). Pinker´s theory provides him with another nail in the coffin carrying the corpse of human uniqueness. Human beings are not only animals among all others – they are basically a problem-solving machine, among others. In principle, humans have no specific cognitive abilities compared to other problem solving animals - and problems solving animals are in essence problem solving machines. People, animals and computers are very different, but in essence they are all problem-solving devices of the kind produced by Alan Turing described. This idea of the mind has been termed “functionalism” or “the computational theory of mind”.

One weakness with Steven Pinker´s book is that he does not report the extensive discussion of functionalism and the criticism of "the computational theory of mind." One of the main critics is the American philosopher John Searle. Searle argues that the functionalists´ fundamental mistake is that they do not distinguish between (1) a syntactic operation, which - like a computer - replaces some symbols with other symbols according to some basic rules, and (2) semantic sentence comprehension, which connects a symbol with a specific meaning. Our thoughts, feelings, intentions, desires and so on have such a semantic content - and this is what functionalism simply misses.

The point of this objection to functionalism requires some further explanation. Searle set out to illustrate this objection with his story about the Chinese room. A normally intelligent person is placed in a closed

room and receives written questions through a gap. Let's call him Pete. The questions are in Chinese - but Pete cannot speak a word Chinese. So he cannot understand the questions. Fortunately, at his disposal, he has an owner's manual (in English), which helps him to interpret and answer the questions. The manual says such that if you get into a question of wording 准备 行动, then you should answer 提 万 纳 库. Pete has no problem to perform this task. He needs only look up the correct character in the manual. He can perform this syntactic operation without any semantic understanding of the Chinese expressions. Of course, the people outside the Chinese room can get the idea that Pete understands Chinese, but if they find out that he just replaces one Chinese phrase with another by means of an English manual, they realize that Pete did not need to understand a single Chinese character to solve the tasks assigned to him by his instructors.

The story of the Chinese room is controversial in philosophy, but it still shows a weak point in functionalism. The distinctive feature of humans is actually that they understand the sense not only of linguistic signs, but also of meaningful actions and events. This characteristic of the human mind cannot be explained by functionalism. Functionalism may explain consciousness, but only by reducing it to something more limited than it actually is.

There is yet another objection to Pinker´s reductionism, i.e. that mental processes are nothing more than neural processes. There is undoubtedly a close connection between the neural processes and mental phenomena. Pinker gives many good examples of this. When a surgeon with the help of electrodes stimulates a part of the brain, the person may have a particular experience, and if another part is stimulated, the person has another experience. If the brain is exposed to various chemical substances, they will affect the person's perception, mood, personality or intellect. “Every emotion and thought gives off physical signals, and the new technologies for detecting them are so accurate that *they literally read a person´s mind* and tell a cognitive neuroscientist whether the person is imagining a face or a place” (Pinker 2002 – my italics).

But it is one thing to accept certain basic facts about the effects of stimulating various parts of the brain – and another thing to assert that cognitive scientists are “literally” able to read people's thoughts. To be

sure, with objective, scientific methods we can study what happens in the brain and how it works. Neurologists can study various processes in the brain, how synapses work and the interaction between them and between them and our sense organs. But this is not "to literally read another person´s thoughts". Surely, the neurologist must rely on the reports of his patient to make any kind of correlation between mental events and neurological processes in the first place! Each of us has immediate access only to his own mental life or consciousness, not to anyone else´s. (See further Thomas Nagel´s famous essay "What is it like to be a bat?" in Nagel 1979: esp. 167-168.)

If we are to test the hypothesis that mental processes are identical to some physical processes such as the human brain, we cannot study mental phenomena by studying the brain processes. This is to assume what would be proved and we end up in circular reasoning. For the same reason we must rely on introspection to arrive at what is happening in the brain and whether these processes are identical to the mental. However, we can compare what a person finds introspectively with what one observer finds when he is studying the same person's brain activity. The only thing we have discovered so far is that a particular mental event or process correlates with a specific neural event or process ... The two phenomena are simultaneous is by no means the same as they are identical! It seems therefore impossible that in any way empirically investigate or determine if mental phenomena are identical with neural events or processes in the brain (see Svensson 1993: 93 f.).

The Swedish philosopher Gunnar Svensson emphasizes three fundamental differences between mental phenomena and physical processes: (1) Mental phenomena are characterized by intentionality, i.e. they have a specific content and focus on a particular item. Furthermore, (2) they are private. My mental experiences are mine and no one else: they are similar to certain other people but it may of course we never know exactly. Finally, (3) mental phenomena have a conscious character. I am aware of myself as an act, perceptive and reflective personality. The conclusion that immediately comes to mind is, therefore, that mental and physical phenomena cannot be identical. In other words, the mind is of such a nature that it cannot be reduced to something else. Needless to say, this should not be confused with the idea that the mind is something

entirely separate from matter, as Descartes thought when he developed his dualistic doctrine that mind and body are separate substances.

My conclusion is that there are no convincing neurological arguments for the computational theory of mind. Neurological data are consistent with a theory of emergence according to which mental process have a different ontological status than neurological processes, but that mental processes nevertheless emerge out of neurological processes in way that at present is not entirely understood. Neurological data are also consistent with the theory of neutral monism according to which the mental and material can be reduced to an ultimate reality which is neither mental nor material. But this is not the place to embark on an analysis of these alternatives to the computational theory of mind.

Scientific materialism

Let me summarize my analysis so far. I have discussed two neoatheistic arguments claiming that there are scientific evidence against (1) that God is the creator of non-human and human life, and (2) that human beings have a soul - and I have argued that these two neoatheistic claims are inconclusive. (1) and (2) have reasonable interpretations that withstand these arguments. But neoatheists have advanced a third kind of argument that undergirds (1) and (2). At least some of them would affirm a version of materialism according to which "the world consists entirely of particles in motions determined by fundamental physical laws. Everything else is just collections, actions, or properties of these particles" (van Inwagen 1993: chap. 1). Some of them are identity naturalists (such as Pinker) and other genetic naturalists (such as Dennett). Let me focus on Daniel Dennett´s position in his classical *Darwin´s Dangerous Idea* (1996).

Dennett argues that he is a "good" reductionist, but not a "greedy" reductionist. Like Darwin, Dennett wants to explain everything scientifically, but he does not want to explain away Minds and Purposes and Meanings. There are real levels and real complexities, which scientific research must respect. Dennett makes an important distinction between cranes and skyhooks. Skyhooks are "mind-first force or power

or process, an exception to the principle that all design, and apparent design, is *ultimately the result of mindless*, *motiveless mechanicity*" (Dennett, 1996: 76, my italics). There are no such skyhooks, but there are cranes, i.e. "a subprocess or special feature of a design process that can be demonstrated to permit the local speeding up of the basic slow process of natural selection" (Dennett 1996: 76). Sexual reproduction is such a crane, and conscious mind another.

Dennett argues that even if there are cranes, there are no skyhooks. This amounts to the claim that everything is ultimately the result of mindless, motiveless mechanicity. Later in his book he summarizes his argument in the following way:

> There must have been a first living thing, but there couldn´t have been one - the simplest thing is too complex, too designed, to spring into existence by sheer chance. This dilemma is solved not by a skyhook, but by a long series of Darwinian processes: self-replicating macros, preceded or accompanied perhaps by self-replicating clay crystals, gradually advancing from tournaments of luck to tournaments of skill over billions of years. The regularities of physics on which those cranes depend could themselves be the outcome of a blind, uncaring shuffle through Chaos. Thus, out of next to nothing, the world we know and love created itself. (Dennett 1996: 185)

This claim comes rather close to classical materialism, i.e. the idea that the world consists entirely of particles in motions determined by fundamental physical laws. Everything else is just collections, actions, or properties of these particles (van Inwagen 1993: 5).

This becomes clearer in another passage of Dennett´s book, where he joins forces with David Hume's thinking in part VIII of his *Dialogues Concerning Natural Religion* (first published in 1779). Here Hume formulates an alternative idea to the theism, which could explain the apparent design in and of the universe. Philo proposes a variation of the old Epicurean hypothesis:

> Instead of supposing matter infinite, as EPICURUS did, let us suppose it finite. A finite number of particles is only susceptible of finite transpositions: and it must happen, in an eternal duration, that every possible order or position must be tried an infinite number of times. This world, therefore, with all its events, even the most minute, has before been produced and destroyed, and will again be produced and destroyed, without any bounds and limitations. No one, who has a conception of the powers of infinite, in comparison of finite, will ever scruple this determination. (Hume 1779, 1948: 52)

Now, Dennett argues that several versions of this speculation have been seriously considered by physicists and cosmologists in recent years. Dennett mentions John A. Wheeler who 1974 proposed "that the universe oscillates back and forth for eternity". And he continues

> […] a Big Bang is followed by expansion, which is followed by contraction into a big crunch, which is followed by another big bang, and so forth forever, with random variations in the constants and other crucial parameters occurring in each oscillation. Each possible setting is tried an infinity of times, and so every variation on every theme, both those that "make sense" and those that are absurd, spins itself out, not once but an infinity of times (Dennett 1996: 179).

Dennett argues that this Epicurean universe of eternal occurrence is a world picture, which sits better with Darwin´s dangerous idea, than with any other world picture, let alone the Christian or for that matter any religious one. In reality, it is hard to see how the existence of God could explain anything. The ultimate metaphysical question – Why is there something rather than nothing? - may not even make an intelligible demand at all. And if it does, the answer "Because God exists" is probably as good an answer as any, but look at its competition: "Why not?" (Dennett 1996: 180 f.).

Let me make three comments to Dennett´s Epicurean argument. The first concerns the scientific evidence he cites, the second is about the relationship between the Epicurean and the religious hypotheses and the third about Dennett´s arguments against the religious hypothesis.

Dennett's scientific evidence

It is clear that Dennett proposes a scientific materialism – of sorts. I think it is justified to call it scientific, because Dennett claims that there might be scientific evidence for his variety of the Epicurean materialism. This

is so because "Consistency and simplicity are in its favour" (Dennett p. 179). Furthermore, he cites Wheeler´s article from 1974, in which he argues for an eternally oscillating universe, a modern version of the Epicurean hypothesis.

But this cosmology has in fact been cast into serious doubt by the physicist (and Nobel laureate 2011) Saul Perlemutter and his colleagues. In 1998 through studies of super novae they discovered that rather than slowing down, the expansion of the universe is accelerating. This could be described as evidence against the Epicurean hypothesis, that each possible setting of matter is tried an infinity of times. The universe has a beginning in time, but also an end. Referring to a poem by Robert Frost, the Press release from the Swedish Royal Academy of Sciences states:

> For almost a century, the Universe has been known to be expanding as a consequence of the big bang about 14 billion years ago. However, the discovery that this expansion is accelerating is astounding. If the expansion will continue to speed up the Universe will end in ice.

Needless to say, this gloomy outlook challenges traditional Christian eschatology. But it is also at variance with the Epicurean hypothesis as well as with Wheeler´s and Dennett´s idea of eternal recurrence.

The relationship between the Epicurean and the religious hypotheses

What is the relationship between the Epicurean and the religious hypotheses? It would seem that the Epicurean hypothesis implies that the universe is eternal, which the religious hypothesis denies. But this is not necessarily so. Thomas Aquinas discussed the possibility that the world was eternal and argued that, if so, it was not at variance with the claim that God exists and created the world. The essential point in the belief that the universe is the creation of God is not that the universe had a

beginning or it had its origin in the big bang, but rather that it is - eternally, at every moment - kept in existence by God (See St. Thomas, *De Aeternitate Mundi* in Clark 1972: 178 f.). In fact, Aquinas believed that the universe did have a beginning, but this belief was not based on reason. Aquinas believed that this was revealed by God in the Bible. But this interpretation has been challenged by biblical scholars, for example Gerhard von Rad (see von Rad 1972: 51.).

Dennett's arguments against the religious hypothesis

Dennett has another argument against the religious hypothesis. He suggests that the religious hypothesis is unintelligible. It is possible that he means that the religious hypothesis is unintelligible *as a scientific hypothesis*, i.e. that it is not clear what actual or possible facts could count as evidence for or against belief in God or for the world as a divine creation. Here, I would argue, Dennett is correct. Nevertheless, it is possible that the religious hypothesis is a non-scientific hypothesis (see below p. 6-7). The difference between a scientific and a non-scientific hypothesis "does not lie in the kind of explanation provided by the hypotheses, rather it lies in the objects they explain". Non-scientific hypotheses explain ambiguous objects, i.e. objects of which different people may have exhaustive knowledge, but might still "disagree as to the correct description of these objects" (Jeffner 1972: 22). Human nature and the empirical universe as a whole might be examples of such objects.

Conclusion

Theism affirms that "[t]he World consists of God and all that He has made". God is infinite, eternal, and nonphysical. God's creations are finite; some are physical and others are nonphysical. (van Inwagen 1993: 4.) These claims could be interpreted as a non-scientific hypothesis. If so, the critique of Dennett and other neoatheists that the religious hypothesis is unintelligible is unwarranted. Needless to say, non-scientific religious hypotheses present us with several other philosophical problems. But it is not evident that they contradict science - even if they go beyond science.

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> Music saved my life and Music saves me still. I am Jewish, but Beethoven is my religion. I have had such a beautiful life. And life is Beautiful, love is beautiful, nature and music are beautiful. Everything we experience is a gift, a present we should cherish and pass on to those we love. Only when we are so old, only then we are aware of the beauty of live. Music is God. In difficult times you fell it, especially when you are suffering.

Quotes by ***Alice Herz-Sommer*** (Nov. 26, 1903 -).

The oldest survivor of the holocaust.

Astrotheology

Ted Peters

Introduction

The time is ripe for launching a new field of inquiry and reflection, *Astrotheology*. A picture of the cosmos explodes before the eyes of a reader of a recent *Newsweek* magazine cover story, "New Secrets of the Universe" (Greene 2012). Astrobiologists are sending probes to Mars as well as the moons of Saturn and Jupiter, hoping to find signs of microbial life. With the help of the Kepler telescope, discoveries of exo-planets in the Goldilocks zone—not too hot and not too cold—occur monthly. SETI Institute scientists listen twenty-four hours per day for radio signals emitted from extra-solar civilizations. Members of the Mars Society have all but packed their bags for the one way trip to their new colony on the red planet. The cultural tree is ripe with the new fruits of astro-enthusiasm.

Since 1965 scholars in the emerging field of *Science & Religion*—sometimes called *Theology & Science*—have swapped lab coats and clerical collars to draw out the implications of new discoveries in quantum physics, physical cosmology, evolutionary biology, human genetics, neuroscience, and public policy. Perhaps the time is ripe to draw out the implications of astrobiology and related enterprises having to do with space exploration. One item on this list should be given special consideration, namely, the possibility of future contact with an extraterrestrial civilization of intelligent beings. Sometimes the religious scholar is called to respond to cultural currents. A response theology is being called for at this moment.

The call for a theological response is intensified when we recognize that a gauntlet has been thrown down. Religious people, especially Christians, are being challenged, virtually threatened. The Christian faith is so fragile, say critics, that contact with new neighbors in

space will precipitate a crisis, perhaps even a theological collapse. Like a sledge hammer, ETI contact will smash the rock of ages into pebbles.

Physicist turned astrobiologist Paul Davies provides the logic of the challenge. "We can expect that if we receive a message it will be from beings who are very advanced indeed in all respects, ranging from technology and social development to an understanding of nature and philosophy" (Davies 1995, 49). He goes on to warn us of our new inferiority. "The difficulty this presents to the Christian religion is that if God works through the historical process, and if mankind is not unique to his attentions, then God's progress and purposes will be far more advanced on some other planets than they are on Earth....It is a sobering fact that we would be at a stage of 'spiritual' development very inferior to that of almost all our intelligent alien neighbors" (Davies 1995, 50). The astrotheologian needs to ask honestly: is this really true? Let me offer a definition that introduces the task ahead.

> Astrotheology is that branch of theology which provides a critical analysis of the contemporary space sciences combined with an explication of classic doctrines such as creation and Christology for the purpose of constructing a comprehensive and meaningful understanding of our human situation within an astonishingly immense cosmos.

As you can see, astrotheology should not try to become an independent field, in my judgment. Rather, it should see itself as one spoke supporting a larger theological wheel.

As already suggested above, a creative-mutual-interaction (CMI) has developed between theologians and selected fields within science: physics, cosmology, evolutionary biology, genetics, and neuroscience (Russell 2008: 20-24). What interests the astrotheologian are the discoveries and discussions taking place among astronomers,

cosmologists, exo-biologists, astro-biologists, astro-ethicists, and those scientists searching for extraterrestrial intelligence (ETI). As a response theology, astrotheology is at minimum a theology of space science.

Could astrotheology be more than merely a response? On the one hand, it is important for the theologian to respond to culture, especially to the role played in culture by natural science. On the other hand, there are internal drivers for theological speculation and application. What might drive today's theologian to take up the task of astrotheology?

I am convinced that within the human soul there lies an openness to the beyond, a primitive awareness of the transcendent, a readiness to receive a call. God put it there. It belongs to our nature. This openness toward what is beyond is a gift of God's creative grace. And this readiness to listen to God's call does not go away, even if we live lives deaf to God's Word. "Whatever one does, one remains interiorly ordered to absolute communion with God," writes the late Stephen J. Duffy, a Roman Catholic theologian at Loyola University in New Orleans. "To some degree this existential determination seeps into consciousness. It is an attraction and all attractions are necessarily consciously experienced in some measure. In this case it is perhaps confusedly experienced as an appreciation of the goods of the Kingdom. More often this attraction will be lived rather than reflected upon" (Duffy 1992, 23). Perhaps by taking up the question of the cosmic beyond, the astrotheologian might aid human consciousness in trying to understand itself, to listen for the divine call to go beyond even the cosmic beyond.

In what follows we will first review briefly the twin foci of astrobiology and related space sciences, namely, the search for microbial life within our solar system and the search for intelligent life elsewhere in the Milky Way. Then we will turn to pre-Copernican and post-Copernican versions of astrotheology, noting how openly the question of sharing our cosmos with space neighbors has been posed. This will lead to the astrotheologian's immediate agenda, to four questions that need theological attention. These four will deal respectively with the (1) scope of creation? (2) one incarnation or many? (3) making a theological critique of astrobiology? and (4) preparing for contact?

Astrobiology and the Search for E.I.

Notre Dame University astrotheologian Thomas O'Meara sets the agenda. "Faith follows science's suggestions that on other planets something awaits us terrestrials: star-colleagues, star-mentors, and star-friends" (O'Meara 2012, 61). Just what is the science to which astrotheology responds? Among the space sciences, astrobiology stands up and says: look at me!

Astrobiology is "the study of the origin, nature, and evolution of life on Earth and beyond," writes University of Arizona astrobiologist Chris Impey (Impey 2004, 4). Lucas John Mix adds, "Astrobiology is the scientific study of life in space. It happens when you put together what astronomy, physics, planetary science, geology, chemistry, biology, and a host of other disciplines have to say about life and try to make a single narrative" (Mix 2009, 4). The science of astrobiology works with two foci: the search for microbial life within our solar system and the search for intelligent life on exoplanets within the Milky Way. Although a second genesis of primitive life forms on Mars or Titan would be scientifically exciting, of greater import to the theologian would be contact with an intelligent species elsewhere in or even beyond our galaxy.

The *NASA Astrobiological Roadmap* raises three orienting research questions: (1) How does life begin and evolve? (2) Does life exist elsewhere in the universe? (3) What is the future of life on Earth and beyond? (NASA). Has there been a second Genesis? By *second Genesis* we mean "the emergence of life beyond the Earth" (Chela-Flores 2009, 2). "Astrobiology aims at the larger questions of modern science," he writes; "while being squarely set on scientific and technological tools. Science is searching a second Genesis" (Chela-Flores 2009, 109). Or, are we alone?

Steven Dick and James Strick observe that "these are fundamental questions that humanity has asked in increasingly subtle and refined forms over millennia" (Dick and Strick 2005: 10). Do these questions challenge a geocentric worldview? Yes. "As Darwinism placed humanity in its terrestrial context, so exobiology will place humanity in a cosmic context. That context—a universe full of microbial life, full of intelligent

life, or devoid of life except for us—may to a large extent determine both humanity's present worldview and its future" (Dick and Strick 2005: 9).

As the astrobiologist looks beyond Earth, the first thing he or she looks for is microbial life within our solar system. One question nags the astrobiologist: if there has been a second genesis of life on another heavenly body such as Mars or Titan, what if it is so different from life on Earth that we might find it hard to recognize? What if extraterrestrial microbial sized life does not rely on DNA or contain protein? One clue that it is life and not non-life could be found in its effects. Life on Earth has altered our planet's chemistry. Could we look at an environment that looks like it has been influenced by life and then work backwards? Could we start with a biosignature and work backward to the pen that wrote it?

Amino acids might provide researchers with an indicator. In a strictly abiotic or lifeless environment, amino acids are typically six carbon atoms or less long. In biota, we expect acids up to thirty carbon atoms long, with a preference for even-numbered chains. By measuring amino acid structure, we may be able to identify the presence of life forms that differ significantly from life as we have known it on Earth. Could we expect to see on other planets what we have seen on Earth? Yes, answers NASA's Chris McKay. "The chemical signatures we see on Earth are not a quirk of Earth biology but a universal principle" (Mckay 2011, 10). Working with the assumption that the same physics and chemistry we witness here on Earth would apply to every object in space, scientific sleuths are dropping probes and rovers and shovels along with on-site chemical labs onto the surface of every suspected home for life.

When it comes to searching for intelligent life or ETI, searchers look first for a habitat and then try to find out who lives there. Extrasolar planets are thought to provide just such a habitat. Scientists are just at the stage of identifying the extrasolar addresses.

Two methods for detecting extrasolar planets are currently employed by researchers. First, radial-velocity surveys analyze the motion of a star induced by its orbiting partner—that is, by measuring a star's wobble astrophysicists can speculate that it might be caused by the gravitational pull of an orbiting planet. Second, star watchers can engage in visual searches for planets that transit in front of their primary star. When locating a black dot (the shadow side of an orbiting planet?) in front of a brightly lit star, telescope viewers can make a series of photos

over a period of time to see if it moves in a regular pattern. If so, the black dot might be considered a transit—that is, a planet in orbit. Direct imaging is difficult, as one might imagine, because each star is bright whereas each planet only reflects the star's light. High contrast techniques are being developed. At the present time, these two methods can detect only large planets, the size of Jupiter. If the technology improves, we may in the future find ourselves able to detect earth sized and biophilic objects as well.

Some astronomers believe they are actually seeing them. Here is one example. Formalhaut is a bright star about 25 light years distant surrounded by a dust belt. Looking with the aid of the Hubble Space Telescope, photographic observations in 2004 and 2006 have led researchers to believe they have found evidence of a number of orbiting objects. Optical observations of one, Fomalhaut b, suggest it is a planet with three times the mass as our Jupiter (Kalas et. al. 2009). And, here is another example. HR 8799 is a star in the Pegasus constellation around which astrophysicists believe they have seen three planets in a counter clockwise orbital motion. The direct imaging technique employed can detect Jupiter sized objects, which these three must be (Marois et.al. 2008).

What about an Earth-sized planet in the habital zone? In 2009 David Charbonneau at the Harvard-Smithsonian Center for Astrophysics and his co-investigators reported their discovery of a near earthlike exoplanet, GJ 1214b. This "transiting planet" has "a radius 2.68 times Earth's radius, indicating that it is intermediate in stature between Earth and the ice giants of the Solar System" (Charbonneau 2009, 891). Scientists believe this planet contains a huge amount of water surrounding an inner core of iron and nickel with an outer mantle of silicate rock. Its atmosphere is likely made up of hydrogen and helium. This is not yet a duplicate Earth, but it is getting closer.

With the logging of each new exoplanet, astrobiologists give us the sense that we are getting closer and closer to learning the answer to the nagging question: are we alone in the universe? As of this writing, no empirical evidence confirms that we share our universe with second genesis neighbors. Curiously, despite the advances in astronomy and astrophysics, our pre-Copernican ancestors found themselves in almost the same position. They looked at the starry heavens and wondered.

The vault of the night heaven elicits within us this sense of wonder. “Cosmology is a voyage of the human spirit,” says Harvard astronomer Owen Gingerich (Gingerich 2009, 29). Julian Chela-Fores, a Venezuelan astrobiologist, remarks, “The depth of the questions in astrobiology should be the source of a fruitful dialogue with other sectors of the humanities, including theology” Chela-Flores 2009, 2). Might we suggest that an incipient spirituality lurks already within the astro-imagination? Might the science itself give birth to an astro-spirituality?

David Toolan thinks so. “What, I ask myself, is the effect of post-Einsteinian cosmology on my spiritual practice--and by that I mean both the inward work of prayer and contemplation as well as the outward work of social action? Does the expanding, replenishing universe of the big bang, black holes, and "dark matter" make a real difference to the way in which we believers pray and work?... A post-Einsteinian universe is unimaginably vast and ancient, is blessed with steadfast stability; still more remarkably it is also graced with process, self-organization, interconnection, communication, fluctuation, and openness. This is a universe whose fullness, diversity, promise, and risk simply dazzle. Given all that, it has to make a difference to our conception of God, our prayer life, our work and action” (Toolan 1997).

Paul Davies challenged the Christian faith coming from one direction: duck because ETI is going to crash into you! Now, David Toolan challenges the faith from the opposite direction: astro-consciousness will enrich your spirituality! Lucas Mix adds, “As a Christian, I think of astrobiology as a way to better understand how God created the world” (Mix 2009, 6). Did our theological ancestors experience astro-awareness and respond? Yes, indeed. We today are heirs to a tradition in astrotheology.

Astrotheology’s Seeds and Sprouts

Fortunately, we have two hard working historians who have traced the Western history of concerns regarding extraterrestrial friends and enemies: Michael J. Crowe at Notre Dame and Stephen J. Dick at the National Air and Space Museum. These two make it clear that the

questions raised by today's astrotheologian are not new. They go back as far as ancient Athens. The seeds of astrotheology were already sprouting in the days of the Parthenon and the peripatetic philosophers.

A controversy broke out between the atomists and the Aristotelians. Atomists such as Leucippus (d. 480 BCE) and Democritus (d. 361 BCE) along with Epicurus (c. ca. 270 BCE) and Lucretius (d. 55 BCE) held that our cosmos is infinitely large with an infinite number of patterns. They posited a plurality of worlds (*aperoi kosmoi*). Somewhere out there in space there might be another world complete with intelligence. Aristotle (d. 322 BCE) and his disciples, in contrast, argued for one world and one world only, ours (Crowe and Dowd 2012). The finite and visible world is all there is, and the Earth is the center. The Christians sided with Aristotle, at least for the most part. From Aristotle medieval Europe inherited the centering principle, what pundits later called *geocentrism.*

Geocentrism and the question of many worlds did not sit on top of the Christian theologian's priority list in the pre-Copernican era. However, without much debate, Aristotelian Earth-centrism seemed to make sense in the emerging Christian worldview. The Angelic Doctor, St. Thomas Aquinas (1224-1274), weighed the issue of many worlds carefully. He temporarily entertained an argument in favor of pluralism: "it is better that there be many worlds than there be one because many good things are better than a few" (Summa Theologiae.I:Q47; A3). Thomas, to the contrary, determined that one world is the superior option. "It is necessary that all things should belong to one world," he said. Why? Because of what Plato and Aristotle had previously said. According to Plato's *Timaeus* 31, the oneness of God makes it appropriate for God to create but one world. And, according to Aristotle ("On the Heavens" I: 8: 276-277; "Metaphysics" XII: 8:33), perfection is associated with oneness (all things in the world tend to center around a single center) and this implies that one world would better testify to God's perfection.

To the authority of the Greeks Thomas added a scientific argument based on the law of gravity. "For it is not possible for there to be another earth than this one, because every earth, wherever it might be, would be born by nature to this middle point. And the same reason applies to the other bodies which are parts of the universe" (*Summa Theologiae*

I.Q47.A3; O'Meara, 2012, 69-70). All heavy items—including other planets—would be drawn toward the single center of gravity, so to speak. This means we have one and only one world.

Let us notice two things here. First, Thomas does not appeal to Scripture to trump reason. Second, Thomas registers no shock or revulsion at the question. Rather, he even-handedly debates the matter before drawing a negative conclusion.

Thomas Aquinas took one side of the debate, the geocentric side. John Buridan (1295-1358) took the opposite side, the many worlds side. He subjected Aristotle to critical examination, just as Thomas had; but he drew the opposite conclusion. Aristotle, arguing from nature, had prohibited the creation of multiple worlds, because nature obeys the centering principle. But, rather than appeal to nature, could we by faith assert that God could create other worlds of a different type or different species? Yes, says Buridan. "We hold from faith that just as God made this world, so he could make another or several worlds" (Dick 1982: 29).

Buridan was by no means alone with this idea. Nominalist William of Ockham (1280-1347) similarly affirmed that God could create other worlds, even worlds better than the one in which we live (Dick 1982: 33). In his *De docta ignorantia* of 1440, pre-Copernican Nicholas of Cusa affirmed belief in ETI and—apparently overcoming his anthropocentrism--speculated that perhaps extraterrestrials are of higher nobility than we earthlings, that "the earth is perhaps inhabited by lesser beings" (Lovejoy 1936: 115). The pre-Copernican tendency to support geocentrism was based upon loyalty to Aristotle; and this could be offset by appeal to the principle of plenitude, according to which God's gracious love would naturally lead to the creation of as many creatures as possible to benefit from this love. All of this was speculation, of course. The theologians knew this. In certain ways the question of many worlds provides a screen on which we can project the implications of prior theological commitments.

Did the Copernican revolution shock the medievals into what we today deem the heliocentric truth about the universe? No. At least not immediately. The revolution began, of course, with Copernicus' book on revolution, *De Revolutionibus Orbium Coelestium* (*On the Revolutions of the Celestial Orbs*). It was published in Nuremburg by the German Lutherans in 1543. Copernican cosmology advanced among the Germans

with the work of Johannes Kepler (1571-1630); and it leaped forward in Italy with that of Galileo Galilei (1564-1642).

But the father of Danish astronomy, Tycho Brahe (1546-1601), slowed the spin of the Copernican revolution. Although he granted that the other planets might circle the sun, the sun still circled the Earth. The problem with Copernican heliocentrism, he thought, was that it implied that the fixed stars would be very distant. This distance meant they would be disconnected with Earth's system and, hence, useless. At least useless to Earthlings. They would be useful if peopled with their own inhabitants, of course. But Tycho denied that such creatures could "be conferred upon those bodies," and added that "nothing is idle, nothing in vain"—the principle of plenitude. This led him to the conclusion: the Copernican model must be false (Dick 1982, 74). In contrast to Kepler, with whom he worked in Prague, Tycho could not affirm either complete heliocentrism or the existence of extraterrestrial life.

Copernicus, Brahe, and Kepler used their naked eyes to study the stars. Galileo began the new era of telescope viewing. In a letter to Galileo, Kepler wrote, "I must point out that there are inhabitants not only on the moon but on Jupiter too" (Dick 1982: 59). Copernicus' universe was teeming with life, thought Kepler.

We should observe that neither the ancient Athenians nor the medieval scholastics nor the Copernicans used the term *astrotheology.* This label had to wait for post-Copernican times and the work of an Anglican clergyman, William Derham (1657-1735). His book, *Astro-Theology, or a Demonstration of the Being and Attributes of God from a Survey of the Heavens,* was published in 1714. Our use today of this term now has a three century history.

Derham speculated. He contended that each star is itself a sun like ours with a family of orbiting planets, also like ours. These planets orbiting fixed stars, he declared "to be habitable worlds; places...accommodated for habitation, so stocked with proper inhabitants" (Crowe 2008: 125). Derham could not prove this. So, he asked for either a direct divine revelation or better scientific instruments to confirm or disconfirm his speculation. The task of astrotheology in Derham's era was to glorify God by stressing the immensity and magnificence of God's creation. When we turn to the 21st century, astrotheology's task has become a bit more modest by asking: just how

should theologians assess and interpret the findings of astrophysics and astrobiology; and how might theological reflection be affected by these findings?

Astrotheology's Buds and Blooms

Like any other branch of Christian theology, astrotheology must take into account the four primary sources: scripture, history, reason, and experience. Incorporating advancing scientific knowledge into theological knowledge makes proper use of reason and experience; and examining the history of precedents in philosophy and theology opens the astrotheologian to incorporating history. But what about scripture? What does the Bible say about extraterrestrial aliens? Nothing.

"At no point in Christian Scriptures do we learn that there is another race of knowing corporeal beings in the universe—or that there is not" writes O'Meara (O'Meara 2012, 43). Pre-Vatican II Roman Catholic giant Yves Congar weighed in, suggesting the absence of biblical material provides an opening for addressing the matter of extraterrestrial beings. "Revelation being silent on the matter, Christian doctrine leaves us quite free to think that there are, or are not, other inhabited worlds" (Congar 1961, 185). No contemporary theologian would require that the Bible address directly each and every new understanding gained by the modern world. Our theological task is to interpret scripture, to extrapolate and apply what we interpret. Such interpretation requires a certain level of imagination, speculation, and anticipation. The product of interpretation is not apodictic dogma but rather hypothetical or tentative probabilities. This by no means weakens speculative theology, but it does provide us with a meaningful framework within which to live our lives in faith.

When we turn to theological anthropology, we need to speculate about alien nature. Will extraterrestrials be like us or different? Will we share the same nature, the same status before God? Karl Rahner emphasized two attributes belonging to human nature: intelligence and freedom. Intelligence and freedom open us to transcendence, open us to a relationship with God. Might this apply to our new neighbors in space?

Rahner addressed the matter. Beings living among the stars who are intelligent and free are "not distinguished in an important way by where they are located in the cosmos... [but rather by] "their intellectual subjectivity determining the reality of space and time" (Rahner 1964, 1061-1062).

Biblical anthropology includes the concept of the *imago Dei*. We human beings are created in God's image. Adam and Eve are given the *imago Dei* in Genesis; and the risen Jesus Christ becomes the eschatological image of God (*eikon tou Theou*) in the New Testament, drawing us into the divine reality itself. Will either the inborn *imago Dei* or the sanctified *imago Dei* apply to extraterrestrials? Yes, says Thomas O'Meara. "Jesus' teaching and life bring an eschatology for Earth and not an astronomy for the Milky Way;...however...the union of the Logos and a terrestrial human would be a strong affirmation of the dignity of corporeal, intelligent life wherever it is found" (O'Meara 2012, 50).

In Western theology and Western culture more generally human dignity is not only an ontological category; it is also a moral category. Dignity implies inviolability. We treat a person with dignity as a moral end, never merely as a means to some further end. Dignity is our birthright. According to the *Universal Declaration of Human Rights*, General Assembly of UN, 1948: "All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act toward one another but in a spirit of brotherhood."

One theological problem with this concept of dignity, in my judgment, is that the presence of dignity is contingent on possession of certain attributes. If one has intelligence and the capacity for moral freedom, then there exists a warrant for being treated with dignity. An intelligent creature earns the right, so to speak, to be treated as a moral end.

Yet, biblically speaking, the *imago Dei* and its accompanying dignity is a gift of God; it is not a human attribute that warrants God treating us as an end rather than a means. Dignity derives from God's grace, I believe. Brent Waters emphasizes the role of grace here. "Human dignity is not an inherent quality, but is derived from the gift of grace given by God in Christ" (Waters 2006, 190). Like other gifts of God's grace, the *imago Dei* comes to us from beyond us; it is not ours to claim

as a byproduct of our capacity to reason. Despite this caveat, I forecast that most astrotheologians will rely upon the previous view, namely, the absence or presence of intellectual reason will provide the criterion for attributing dignity to our friends and neighbors in space.

Be that as it may, Boston University's John Hart draws out the implications of alien dignity based upon intelligence for an ethic of the commons. Space will become a common moral arena for earthlings and spacelings. "The *cosmic commons* is the spatial and local context of interactions among corporeal members of integral being who are striving to meet their material, spiritual, social, and aesthetic needs, and to satisfy their wants....The cosmic commons includes the aggregate of goods which, beyond their intrinsic value, have instrumental value in universe dynamics or as providers for the well-being of biotic existence. In the cosmic commons, goods that will eventually be accessible on the moon, asteroids, meteors, or other planets should prove useful to humankind, to other intellilife, and to biokind collectively" (Hart 2010, 377).

Note how for Hart moral responsibility is contingent upon intelligence. "In the cosmic commons...intelligent life has particular responsibilities, including respect for forms of life less complex than it is, and regard for common habitat" (Hart 2010, 377). Even so, the speculative vision of an interstellar community of intelligent beings can be inspiring to the new breed of astrotheologians. O'Meara exhibits this enthusiasm. "Interactivity and community are patterns in reality reaching from the Trinity to the families of stars. Possibly there lies ahead in Earth's future not only the knowledge of individual planets with their societies but also an awareness of galactic communality" (O'Meara 2012, 38-39).

The Scope of God's Creation

Imagining a galactic community or a cosmic commons brings me to the first of four agenda items I would like to pose to today's astrotheologian. First, *Christian theologians along with intellectual leaders in each religious tradition need to reflect on the scope of creation and settle the pesky issue of geocentrism* (Peters 2010, 2013). Critics within and

without Christian theology allege that this faith is geocentric and anthropocentric. This makes the Christian faith anachronistic and out-of-date due to increased awareness of the vastness of our universe and the possibility that we share it with other sentient creatures.

We can see from the discussion above that pre-Copernican geocentrism was something shared between European Christians and all those who inherited the ancient Athenian worldview. The Aristotelian centering principle dominated. Even so, some pre-Copernican theologians had gone against the stream and argued for other worlds and for neighbors in space, all of whom would be creatures of the one God of the cosmos. As geocentrism fell in science it fell also in theology; but theological interest in extraterrestrial neighbors continued without significant change from pre-Copernican to post-Copernican times.

The anthropocentrism of our medieval ancestors was similarly founded on ancient Athenian values, especially the value attributed to intellectual capacity, intelligence, and reason. This human attribute continues to dominate contemporary anthropology in both theological and secular worldviews. The Enlightenment doctrine of human dignity depends upon the high value we place on this attribute. I recommend that the Christian theologian provide a critical examination of the assumptions at work here; but we can at least cease blaming an atavistic Christian faith alone for holding to such an anthropocentrism.

With geocentrism and anthropocentrism in mind, the astrotheologian can evaluate the critique lodged by Paul Davies cited above. Is the Christian faith fragile? Will it collapse at contact? There is no evidence to support Davies here. To the contrary, just the opposite seems to be the case. Michael Crowe makes this clear. "It is sometimes suggested that the discovery of extraterrestrial life would cause great consternation in religious denominations. The reality is that some denominations would view such a discovery not as a disruption of their beliefs, but rather as a confirmation" (Crowe 2008: 328-329; Peters 2009). Among the tasks for the astrotheologian, then, is the need to clarify if not correct the regnant opinion on the matter of geocentrism. This correction can take the form of enlarging the scope of the concept of creation. Our world is the universe; the upper limit or totality of all physical things including the solar system, the Milky Way, the systems of galaxies.

There is nothing that lies beyond the scope of God's creation according to the *People of the Book:* Jews, Christians, and Muslims. God is the creator of all things, visible and invisible, known and unknown. When biblical Christians speak of creation, it includes all of physical reality. The immensity of God surpasses the immensity of the universe. After all, since Anselm we have thought of God as that than which nothing greater can be conceived. Therefore, says Georgetown University's John Haught, "All possible worlds have a common origin and depth in the oneness of God" (Haught 2003, 179).

Expanding the scope of creation from planet Earth to include the entire cosmos, including space neighbors, has already been addressed by many of our most respected theologians. Karl Rahner acknowledged that there are "many histories of freedom which do not only take place on our earth" (Rahner 1978: 446). Hans Kűng holds that "we must allow for living beings, intelligent—although quite different—living beings, also on other stars of the immense universe" (Kűng 1984: 224). Paul Tillich asked: how should we "understand the meaning of the symbol 'Christ' in the light of the immensity of the universe, the heliocentric system of planets, the infinitely small part of the universe which man and his history constitute, and the possibility of other worlds in which divine self-manifestations may appear and be received?" (Tillich 1951-1963, 2:95). Geneticist and Evangelical spokesperson, Francis Collins, explodes: "If God exists...why would it be beyond His abilities to interact with similar creatures on a few other planets or, for that matter, a few million other planets" (Collins 2006, 71).

The ETI question is by no means the only one to ask when expanding the scope of the concept of God's creation. The issue has to do with the three hundred billion stars within the Milky Way and the fifty billion galaxies beyond the Milky Way. It has to do with a 13.7 billion year history and perhaps a 100 billion year future. It has to do with both the personal and non-personal history of our cosmos in light of God's providence and promise. Robert John Russell argues strenuously for God's providential action at the sub-atomic quantum level and—even though atoms are small they are everywhere!—divine action applies to Andromeda as it does here. "When we shift to an *in*deterministic world, a new possibility opens up: One can now speak of objective acts of God that do not require God's miraculous intervention but offer, instead, an

account of objective divine action that is completely consistent with science" (Russell 2008: 128). An astrotheologian is a cosmic theologian.

Still, breadth is no substitute for depth. God may be beyond, but God is also intimate. Astrotheologian David Wilkinson broadens the scope of the concept of creation to include extraterrestrials; but he reminds us that the deeper dimensions of the human soul remain the focus of God's redemptive work. "We are not alone. The God who made the Universe wants to be in relationship with us. There is a purpose to our existence. We are created as an act of extravagant love by God....Extraterrestrial life may exist and even intelligent life...But such life will never deliver answers to loneliness, purpose, identity, fear and salvation" (Wilkinson 1997, 146).

Planet-Hopping Incarnations?

The second of the four initial questions on the astrotheologian's agenda is the Christological question. Will the divine become incarnate on many planets for many species of aliens? Or, is one incarnation—Earth's incarnation in Jesus Christ—enough? Here is the directive: *the astrotheologian should set the parameters within which the ongoing debates over Christology (Person of Christ) and soteriology (Work of Christ) are carried on.* It should be dubbed a mistake to connect the incarnation with geocentrism. The question of multiple incarnations is a reasonable one, but not if the negative answer justifies geocentrism.

O'Meara sizes up the issue. "As incarnation is an intense form of divine love, would there not be galactic forms of that love? An infinite being of generosity would tend to many incarnations rather than to one....A succession of incarnations would give new relationships and new self-realizations of God....Incarnations among extraterrestrials would not be competing with us or with each other" (O'Meara 2012, 47).

Jesuit evolutionary theorist Pierre Teilhard de Chardin would likely side with O'Meara. He affirmed multiple incarnations while decrying geocentrism. "The hypothesis of a special revelation...teaching the inhabitants of the system of Andromeda that the Word was incarnate on Earth, is just ridiculous. All that I can entertain is the possibility of a

multi-aspect Redemption which would be realized on all the stars" (Teilhard 1971, 44). Similarly, Tillich argued that we should expect divine self-manifestations among intelligent species on other planets. He granted the necessity for speculation here. "Incarnation is unique for the special group in which it happens, but it is not unique in the sense that other singular incarnations for other unique worlds are excluded...Man cannot claim to occupy the only possible place for incarnation" (Tillich 1951-1963, 2:95-96).

Rejecting multiple incarnations in favor of only the one on Earth, Wolfhart Pannenberg acknowledges that the "discovery of nonterrestrial intelligent beings" is a matter of theological concern. Then the Munich theologian argues that "the Logos who works throughout the universe became a man and thus gave to humanity and its history a key function in giving to all creation its unity and destiny" (Pannenberg 1991-1998, 2:76). The history of salvation on Earth will eventually converge with the history of the entire universe, and the redemptive work of Earth's Christ will be efficacious for the entire cosmos.

O'Meara takes a puzzling stand on this issue. On the one hand, he seems to affirm multiple manifestations of a revelatory or disclosure sort. On the other hand, he denies that these would constitute additional incarnations of Jesus Christ. "Incarnation in a human being speaks to our race. While the possibility of extraterrestrials in the galaxies leads to possible incarnations and alternate salvation histories, incarnations would correspond to the forms of intelligent creature with their own religious quests. Jesus of Nazareth, however, is a human being and does not move to other planets....If the risen Jesus Christ visited another planet, it would be a celestial disclosure, but it would not be a further incarnation....The possibility of incarnation for extraterrestrials does not diminish the reality of Jesus Christ" (O'Meara 2012, 48-49). What O'Meara seems to be saying is this: God's eternal *logos* might manifest itself multiple times on many planets, but the historical Jesus Christ (the human *hypostasis*) would not be duplicated. Perhaps this is what each theologian means when he or she supports the idea of multiple incarnations.

The astrotheologian should be cautious here. An argument for a single incarnation ought not to double as an argument in favor of geocentrism. Philip Melanchthon (1497-1560) provides a misleading example. Despite the fact that the Lutherans at Wittenberg and

Nuremberg had been responsible for the publication of Copernicus' *De Revolutionibus*, Reformer Melanchthon argued against the plurality of worlds on Christological grounds. "The Son of God is One; our master Jesus Christ was born, died, and resurrected in this world. Nor does He manifest Himself elsewhere, nor elsewhere has He died or resurrected. Therefore it must not be imagined that there are many worlds, because it must not be imagined that Christ died and was resurrected more often, nor must it be thought that in any other world without the knowledge of the Son of God that men would be restored to eternal life" (Dick 1982: 89). Despite what the first Protestant systematic theologian says here, the existence or non-existence of other inhabited worlds with intelligent creatures is not a Christological question. It is a scientific question. Or, within theology, it is a question about the scope of creation.

The question of multiple incarnations depends in part on whether one thinks of soteriology in terms of revelation or in terms of atonement. If the work of Christ is primarily that of a teacher who reveals the truth about God, then one would tend to embrace multiple incarnations, one for each intelligent species whom God wishes to invite into the divine fellowship. If, on the other hand, one thinks of the work of Christ in terms of atonement—as a work of redemption accomplished on behalf of the entire fallen creation—then a single incarnation would suffice.

Let us compare John Polkinghorne with George Coyne. Polkinghorne seems to embrace the first option, Christ as revelatory. Therefore, he needs to affirm species-specific appearances on various planets. "God's creative purposes may well include 'little green men' as well as humans, and if they need redemption we may well think that the Word would take little green flesh just as we believe the Word took our flesh" (Polkinghorne 2004: 176). In contrast, former Vatican Observatory director George Coyne opts for the second, for a single work of atonement efficacious for all. "How could he be God and leave extraterrestrials in their sin? After all he was good to us. Why should he not be good to them? God chose a very specific way to redeem human beings. He sent his only Son, Jesus...and Jesus gave up his life so that human beings would be saved from their sin. Did God do this for extraterrestrials?...There is deeply embedded in Christian theology…the notion of the universality of God's redemption and even the notion that

all creation, even the inanimate, participates in some way in his redemption" (Coyne 2000: 187).

Whether an astrotheologian sides with multiple incarnations or a single one, the key is that God's redemption is cosmic in scope. Citing the patristic tradition, Keith Ward rightly foresees God's eschatological future as "the uniting of all things—all galaxies and whatever beings there are in them—in Christ, the creative Word of God" (Ward 2002: 244).

Should Theology Critique Science?

The third item on the astrotheologian's To Do list includes analyzing what we receive from the work of our scientists. Should we accept what natural scientists say about our world without criticism? Or, should the theologian provide an analysis of scientific claims that may reveal hidden matters relevant for theological assessment? With the latter in mind, here is the third agenda item: *theologians should analyze and critique astrobiology and related space sciences from within, exposing extra-scientific assumptions and interpreting the larger value of the scientific enterprise*. Although scientists should be respected and honored for what they know and for what they promise, scientific claims should not be given a free pass. Scientific claims should be subjected to critical review by religious thinkers.

The theological critique of science targets two domains: first, mistaken images held within the scientific community of theological matters and, second, assumptions and trajectories that frame the scientific picture itself. Regarding the first, Heidelberg theologian Michael Welker speaks forcefully: "Theology can and must challenge the natural sciences to correct their false perceptions of theological themes and contents" (Welker 2012: 14). Correcting mistaken views of what religious believers actually believe—mistaken by both scientists and theologians in some cases--warrants the theologian's attention. The distortions proffered by scientist Paul Davies, referred to above, should receive just this kind of critical review so as to get clear on just what is at stake theologically.

In addition, the theologian may on occasion need to enter the internal domain of science with analytical and critical tools. Quite frequently extra-scientific or even ideological commitments slip into scientific frameworks at the level of assumption. Materialism and ontological reductionism, among other ...isms, are common. Even atheism in many cases. In the field of astrobiology and its sister, SETI, an over-interpreted variant of Darwinian evolution frames and guides the research program. Despite the fact that leading evolutionary biologists decry the presence of a progressive entelechy or directional purpose in evolution, space researchers frequently work on the assumption that life's genesis is almost inevitable where pre-biotic chemistry is present and, even more suspiciously, that once life gets going it will progress toward increased complexity, toward intelligence, and toward science and technology as we know it. In short, the presumed purpose of the entire history of our natural cosmos is to produce the very persons studying the cosmos, our scientists (Peters 2008; 2009). This is a disguised form of geocentrism, now transformed into scientist-centrism. Religious intellectuals may wish to point this out from time to time.

A close look will show that mythical elements are alive and well within the scientific worldview. The extra-scientific leaven here I dub the *ETI myth* (Peters 2009). James Herrick substitutes the term "Myth of the Extraterrestrials." Because science fiction has influenced science proper, he contends, this myth includes "the idea that intelligent extraterrestrials exist and that interaction with them will inaugurate a new era in human existence" (Herrick 2008: 51). Spiritually deprived modern culture is thirsting for superior entities in space who can save our planet and, according to Herrick, this is a poor substitute for the classic God of theism and its genuine promise of redemption. Herrick fears that the ETI Myth--replete with the alleged evolutionary promise that we can employ science and technology to achieve our own redemption and that our more highly evolved ETI neighbors are already where we are going—will replace the Christian faith, not augment it. "This is the Christian church's challenge today—to reclaim its story and tell it in such a way that it stands out among all the others as authentic, as the Great Story that other stories have often sought to imitate" (Herrick 2008: 252). Or, "The biblical message is that transforming grace rather than an evolving human race is the means of discovering our spiritual destiny. Salvation is

the liberating gift, not of benevolent aliens, but of a preexistent, creating and redeeming God" (Herrick 2008: 261). The astrotheologian should subject astrobiology to careful scrutiny, because embedded in the science just might be a pseudo-theology, a mythical hope for secular salvation. This certainly seems to be the case in many versions of the space sciences. It just may fall to the theologian to distinguish sharply between what counts as good science and what counts as disguised religion. It is the former that we want from the scientific community, not the latter.

In sum, astrobiology and sister fields should be celebrated for the fertile science that continues to produce new knowledge about our immense and complex universe. However, this celebration is limited to science that remains science. The theologian should offer a critique when the science drifts toward disguised ideology or substitute religion.

The Place of the UFO Phenomenon

The astrotheologian partners primarily with the astrobiologist. Astrobiology is a growing field within natural science, and it is gaining public as well as private financial support. Astrobiologists and other space scientists are appropriate partners for today's astrotheologian to pursue his or her work.

Still we must ask: should the astrotheologian address matters arising from the UFO phenomenon? Yes. This is because the UFO phenomenon is a cultural phenomenon, and culture belongs on the list of sources demanding theological analysis and interpretation. In addition, UFO believers believe, among other things, that they belong to science. Science and UFO belief overlap at the cultural level.

The worldwide UFO phenomenon began in June 1947 with pilot Kenneth Arnold's sighting of nine mysterious "flying saucers" near Mount Rainer in the state of Washington; the news waves for half a century were abuzz almost daily with Unidentified Flying Objects or UFOs. Might they be crafts visiting earth from outer space? Awareness of possible alien intelligence became enhanced with extravagant reports by alleged contactees, thriller movies, television sit-coms, conferences, controversies, and icons of little green men (Peters 1977). Revivalist

preacher and purported leader of American evangelical Christianity, Billy Graham (1918-), responded. In his book on angels, the beloved evangelist writes, "Some...have speculated that UFOs could very well be part of God's angelic host who preside over the physical affairs of universal creation. While we cannot assert such a view with certainty...nothing can hide the fact that these unexplained events are occurring with greater frequency around the entire world....UFOs are astonishingly angel-like in some of their reported appearances" (Graham 1975: 9-14 *passim*).

Some fundamentalists to Graham's right, in contrast, identify flying saucers with Lucifer's angels, with demons, and seek to discourage fascination with these mysteries in the sky (Allnutt). To Graham's left is Barry H. Downing, a Presbyterian minister with a doctorate in science, who seeks to bring harmony with his book, *The Bible and Flying Saucers.* Downing offers a hermeneutic of scripture based upon an extraterrestrial interpretation (Downing). He endorses the *ancient astronaut* theory, according to which technology and even life itself has been seeded and cultivated on earth by extraterrestrial gardeners. What ancient Christians thought were visits from supernatural beings were in fact natural—though extraterrestrial—beings.

Are visiting ufonauts divine or demonic? Orthodox interpreter of culture Seraphim Rose contends that the UFO phenomenon is demonic. The devil has placed what looks like spaceships in our skies to satisfy the hunger of modern spiritually starved earthlings with a meal of naturalistic and futuristic religious belief. The eschatological utopia offered by alleged aliens who are more evolutionarily advanced than ourselves is a delusion, a temptation to take us away from the true revelation in Jesus Christ. "Dabbling with UFOs can be as dangerous as dabbling with black magic" (Rose 2004: 12).

For the most part today's astrotheologians dodge the extraterrestrial hypothesis associated with Ufology and side primarily with what they deem the more credible sciences of space exploration. Why? Because, as Albert Harrison reports, "Almost sixty years of energetic research has failed to convince scientists that UFOs transport visitors from our own future, carry beings from another dimension, or bring us aliens from outer space" (Harrison 2007: 79). Like Jacob and Esau, ufologists and astrobiologists are rival siblings, seldom seen

together at the same family barbecue. The split between ufologists and establishment scientists signals to the theologian that he or she must apply a more comprehensive hermeneutic of culture just to understand what the deeper issues are that lie beneath this secular split.

Getting Ready for Contact

As of this writing, no empirical evidence exists that confirms the existence of microbial life on other planets or moons let alone off-Earth intelligent beings. Still, we cannot predict what will happen tomorrow. We need to speculate and anticipate. This brings us to the fourth astrotheological agenda item: *theologians and religious intellectuals should cooperate with leaders of multiple religious traditions and scientists to prepare the public for the eventuality of extraterrestrial contact*. No one can predict with precision exactly what is coming. If the day of extraterrestrial contact arrives, re-thinking our terrestrial worldviews should follow. This is likely to be complex, not simple. Albert Harrison observes, "we cannot simply incorporate extraterrestrial ideas without thinking them through, because our systems (supranational, societal, and organismic) have highly interrelated parts, so changes in one arena yield changes in another" (Harrison 1997: 298). Religion is one of those parts, perhaps even foundational for revised worldview construction. John Hart foresees that "the collaboration of scientists, ethicists, and theologians will enhance both reflection on Contact, and terrestrial-extraterrestrial interaction when Contact occurs" (Hart 2010: 390). Cooperation and collaboration are the watchwords.

Planetary readiness informed by wisdom drawn from Earth's historic religious traditions is being called for here. Secular or scientific anticipations are not enough. Religious readiness will be helpful to both religious and non-religious sectors alike. For public policy theorists anticipating the impact of contact, it would behoove them to engage theologians. We might "gain insights from theology into the possible nature of extraterrestrials that we might not consider if we focused only on human nature as studied by science," says SETI's Douglas Vakoch

(Vakoch). It appears clear that today's astrotheologian can contribute to wider public policy concerns.

Sometimes theology is demeaned or ridiculed for following science, and for following it too slowly. Science is frequently described as progressive while religion is pictured as behind, recalcitrant, obstructive. Whether this caricature is accurate or not, the excitement over the prospects of extraterrestrial contact with a second genesis should prompt in the theologian a sense of responsibility. Whether the day of contact comes or not, no harm will be done if we ready ourselves. More can be said. Christians are future-oriented because of God's promised eschatological kingdom. We expect the new. So it fits the Christian profile to ready ourselves for what might be new and fascinating.

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Life in the Universe: Philosophical and Theological Issues drawn from, and influencing Scientific Research[1]

Robert John Russell

Introduction

Over the past half century, the interdisciplinary field of 'theology and science' has undergone tremendous growth involving scholars from philosophy of science, philosophy of religion, the natural sciences, theology, ethics, history of science and related fields.[2] Surprisingly underrepresented in this rapidly growing interaction, however, is a focus on the philosophical and theological issues raised by the possibility of extraterrestrial life (EL) and extraterrestrial intelligent life (ETI).[3] This is particularly curious since historians of science have shown that Christian theology contributed in significant ways to the assumption that ETI does in fact exist.[4] It is particularly timely, then, that these issues be addressed.

There are, in fact, a wealth of topics which could be discussed here.[5] For the purposes of this short presentation, I will focus on the following: In the first part, I will look at the scientific search for ETI and discuss its philosophical and theological implications. In the second part, I will turn the method on its head and ask about philosophical and theological assumptions and presuppositions which lie within, and in some ways shape, the ongoing scientific research for intelligent life in the universe. The latter move reflects the method by which my research in theology and science currently operates, one in which the implications of science are taken critically, via their careful philosophical analysis, into theology and in which theological insights are then allowed to suggest new questions for scientific research, a method which I call Creative Mutual Interation (CMI).[6]

First, two caveats: 1) I will speak from the context of Christian

theology and welcome others to widen the circle of religious discussions of EL/ETI. 2) I will assume that for some forms of ETI the 'contact' scenarios are reasonable. It may be that some extraterrestrial civilizations are millions of years older than ours; for such advanced ETI, these scenarios may simply not apply.[7]

Seven issues in science and their philosophical and theological implications.

In the first part of this essay I look at the philosophical and theological implications of the possible discovery of intelligent life in the universe. This is a standard method in "theology and science," one which Ian Barbour calls a "theology of nature"[8] and which I call "constructive theology in light of the natural sciences." I start with issues which seem to lie, in principle, at the empirical end of the spectrum (even though we as yet have no evidence about them!), and move from there to implications which are more philosophical and theological.

Is Life in the Universe rare or abundant?

The relative abundance of life in the universe is one of the pivotal issues of our time, and a key question in the burgeoning new field of astrobiology. Is life rare or abundant in our solar system, our galaxy, and our universe? Hopefully, we will learn the answer in the reasonably near future at least regarding our solar system. Projects such as the exploration of Mars now underway through NASA's Curiosity[9] and future plans for the exploration of Jupiter's moon Europa might well shed light on the question of pre-biotic and microbial life in our solar system. On the other end of the life-spectrum, projects which listen for signals using radiotelescopes might find evidence of advanced life in the nearby arms of our Milky Way galaxy. A notable example is the SETI Institute[10] in Mountain View, California (SETI is the acronym for "the search for extraterrestrial intelligence").

Until the results of these projects are conclusive, we must be satisfied with theoretical attempts at estimating the relative abundance of

life in the universe, and these attempts remain highly controversial. On the one hand, Stephen Jay Gould has stressed the unlikeliness of intelligent life elsewhere in the universe given the overwhelming role that chance has played in the evolution of life on earth.[11] If life has evolved elsewhere, we should expect radical diversities in its morphologies, diversities reflecting the vastly differing evolutionary histories as shaped by strongly contingent events. Francisco Ayala has gone further and argued that life beyond the microbial stage is extremely unlikely even in our galaxy of several hundred billion stars, given the number of steps from simple living organisms to sentient creatures.[12] On the other hand, Paul Davies[13] and Christian DeDuve[14] have argued that since evolution is tightly governed by the laws of physics and biology, and since these laws produced life on earth, they should produce life in abundance throughout the universe. Julian Chela-Flores has taken De Duve's point one step further, arguing that once life originates, the evolution of eukaryotes will lead to procaryotes. From there the 'convergence' of life towards intelligence is assured, although there may well be significant diversities in the morphologies which underlie intelligence.[15]

Will the answer influence life's value or meaning?

Underlying these issues, however, is a more fundamental question: Is the meaning and value of life a function of its abundance in the universe, or is it essentially meaningful or meaningless *regardless* of what we find through the exploration of our solar system or deep space via projects like SETI? It is this question which has received considerable philosophical and theological reflection.

Arguments for meaninglessness. Some scientists have suggested that biological life *per se* has little significance whether or not we are alone in the universe. They see life as essentially meaningless, a random product of physics and chemistry of no more significance than the wetness of water or the structure of Saturn's rings. Biological processes are just what matter does when really unusual conditions occur, but the universe, "at rock-bottom", is just endless mass-energy and curving spacetime.

Such 'cosmic pessimism' is of course a *philosophical*

interpretation of nature. It is not science, *per se*, nor is it one which can be 'proved' by science, but it is one that has been widely propounded by such eminent scientists as Bertrand Russell[16] and Jacques Monod[17]. It is certainly the impression Steven Weinberg gave in his often-quoted conclusion to *The First Three Minutes*: "(H)uman life is ... just a more-or-less farcical outcome of a chain of accidents reaching back to the first three minutes ...The more the universe seems comprehensible, the more it also seems pointless." [18]

Arguments for meaningfulness. Other scientists disagree with this view, arguing instead for a philosophy in which the evolution of life is, in some modest ways at least, a clue to the meaning of the universe. Paul Davies has depicted the evolution of life in terms of what he provocatively calls "teleology without teleology"[19] Here the emergence of what Davies calls the "order of complexity" is a genuine surprise, arising out of the "order of simplicity" described by the laws of physics. In a related way, William Stoeger has pointed to what he calls the "immanent directionality" of evolution. Stoeger's aim is to show that there is a directionality, perhaps even a teleology, immanent in nature that can be discovered through the natural sciences as they study the emergence of physical and biological structure, complexity, life, and mind.[20] More pointedly in his 1985 Gifford Lectures, *Infinite in All Directions*, Freeman Dyson explicitly rejects Weinberg's opinion, telling us instead he sees "...a universe of life surviving forever and making itself known to its neighbors across the unimaginable gulfs of space and time...Twentieth-century science provides a solid foundation for a philosophy of hope."[21]

What accounts for this difference in views?

Clearly the question of the relative abundance of life in the universe is an empirical one. But until the hard data come in, the differences we have heard above about the value and meaning of life based on the empirical facts, since they are missing to date, are --- not surprisingly --- largely philosophical and theological.

The philosophical difference --- meaninglessness or meaningfulness --- may stem in part from a further division between reductionist and non-reductionist philosophies, since these philosophies

underlie the discussion. If one assumes that the processes and properties characteristic of living organisms can be fully explained by physics and chemistry as Richard Dawkins does, there may be little, if any, basis for attributing meaning and value to life.[22] Non-reductionist arguments on the other hand, such as those deployed by Francisco Ayala[23], Ernst Mayr[24], and Charles Birch[25], offer a basis within natural processes for attributing varying degrees of meaning and value to organisms with differing levels of complexity and organization.

These non-reductionist epistemologies, in turn, play a crucial theological role in a variety of views often referred to collectively as "theistic evolution."[26] This perspective includes two central themes: *creatio ex nihilo* and *creatio continua*. 1) God as transcendent (wholly other, not spatially distant) creates the universe out of nothing (*creatio ex nihilo)*, holding it in existence at each moment and maintaining its law-abiding character which we express scientifically as the laws of nature.[27] 2) God as immanent (wholly present but not pantheistically identified with nature) creates the universe continuously in time (*creatio continua*), working "in, with, under and through" the processes of nature[28], as Arthur Peacocke nicely phrases it. In short, God creates the complex diversity of living species (theistic evolution) by working in and through the natural processes whose very possibilities God created *ex nihilo*.

Scholars in theology and science have developed these themes in light of physical cosmology, quantum physics, chaos and complexity theory, evolutionary and molecular biology, anthropology, the neurosciences and cognitive sciences, etc. Arguably the most remarkable construction in the galaxy is the primate central nervous system: The number of connections between the neurons of the human brain is greater than the number of stars in the Milky Way. This staggering complexity makes possible the almost unimaginable feat of self-consciousness, of knowing oneself as a free, rational and moral agent in the world. Thus on our planet, at least, we are privileged to discover a hint of what God's intentions might have been in creating a universe like ours, with its particular laws of physics. For when the evolutionary conditions are right as they have been on Earth, and as they may be elsewhere in our universe, God, the continuous, immanent, ongoing creator of all that is, working with and through nature, creates a species gifted with the "image of God" (the *imago dei)* including the capacities for reason, language,

imagination, tool-making, social organization, and self-conscious moral choice, a species capable of entering into covenant with God and in turn with all of life.

Thus if it took the precise characteristics of this "fine-tuned" universe to allow for the possibility of the evolution of life, then even if life is scarce in the universe[29] it is life as such that gives significance to our universe --- and even if ours is only one of a countless series of universes, as some inflationary and quantum cosmologies depict. In short, I see life as the enfleshing of God's intentions through biological evolution which, in turn, is possible because of the physics God gives this universe, and together biology and physics are the ongoing expression of God's purposes in creating all that is. God thus offers to nature a special conscious experience of the God who acts immanently within nature as the transcendent ground of its being.

Will intelligent life be capable of both rationality and moral reasoning?

We turn here to the question of the biological origins of ethics.[30] If our human experience of moral capacity, like our capacity for rational thought and relationality, is a gift of God, the *imago dei*, rooted in our biological nature and bequeathed us by God acting in and through evolution, does this suggest that wherever evolution results in creatures capable of rationality they would also be equipped by God with a capacity for relationship and moral reasoning?

Sociobiologists and, more recently, behavior geneticists, have explored the biological basis of human social behavior in order to determine the relation between evolutionary and genetic constraints on the one hand and their cultural expression on the other. Many of them, such as E. O. Wilson, Richard Dawkins and Michael Ruse, are unabashedly reductionistic, interpreting their scientific research in strictly deterministic and functionalist accounts of human behavior. Ruse, for example, has argued extensively that both the capacity and the content of human morality are entirely the products of evolution.[31] He defines biological altruism as any cooperative behavior between organisms that increases 'evolutionary gain', while moral altruism refers to our considered choices to help others because it is seen as 'right' to do so.

For Ruse, moral altruism is a product of (non-moral) biological altruism with "... no objective foundation. It is just an illusion, fobbed off on us to promote 'altruism'".[32]

Geneticist Francisco J. Ayala takes a very different position. For nearly three decades he has argued against reductionism in biology[33], disagreeing dramatically with Ruse over the evolutionary origins of human moral capacity. According to Ayala, evolution selected for intelligence in our ancestral hominid line; one of the many byproducts of intelligence is ethics. "Ethical behavior came about in evolution not because it is adaptive in itself, but as a necessary consequence of man's (sic) eminent intellectual abilities, which are an attribute directly promoted by natural selection."[34] Our ethical behavior, and the norms which we use to govern it, are not determined by our genes or our evolution. Instead ethics is open to cultural, philosophical and religious sources. Similar arguments against reductionism have been developed by a wide range of scientists and philosophers, including Arthur Peacocke[35], Ian Barbour[36], Nancey Murphy[37] and George Ellis.[38]

How does this bear on the question of ETI? If what we have found out about life on earth can be generalized, we may expect that moral capacity will be present wherever life has evolved to the point of intelligence in the universe and biological evolution will predispose but not determine its contents.

What are the theological implications for Christianity?

What sorts of responses might Christian theologians offer to the discovery of ETI with rational and moral capacities? Physicist Paul Davies predicts it would "(shatter) completely the traditional perspective on God's relationship with man (sic)."[39] But theologian Ted Peters finds "little or no credible evidence" for Davies' view.[40] Instead there is rich evidence in the history of Christian thought in support of a "plurality of worlds" and extraterrestrial life in the universe.[41] Contemporary theology, too, has been genuinely open to the possibility of rational and moral ETI. In support of this position Peters cites Roman Catholics, such as George van Noort, Theodore Hesburgh, Hans Küng, Karl Rahner, and Francis J. Connett, conservative Protestants such as Billy Graham, and liberal Protestants such as Krister Stendahl, A. Durwood Foster, and Paul

Tillich.[42] And in a recent poll[43], Peters reports that it is by and large the critics of religion who claim that the discovery of ETI would challenge religious faith, not those who espouse that faith!

Personally I would find the discovery of ETI endowed with rational and moral capacities to be a wondrous exemplification of the intentions of God in creating a universe like ours, namely in order to achieve the evolution of creatures capable of bearing the *imago dei* and entering into genuine community and covenant with God. I am also persuaded by the philosophical arguments of non-reductionists that ethical choice and the contents of our moral codes remains at least partially a 'free variable'. I would therefore expect that ETI will be 'accountable' for its choices in some way even as humanity is. This leads directly to the challenge of moral failure, our final issue in this section of my chapter.

Will ET experience moral failure or be entirely benign?

This question embodies a tragic reality at the heart of human existence. Why do we act with a level of violence against our own kind and other species which far exceeds the needs of survival and far exceeds the level of violence of all other forms of life on Earth? Of course there are evolutionary precedents for such violence, particularly in mammals with whom we share a distant common ancestor. But the level of violence in humankind seems more like a qualitative, rather than a mere quantitative, difference in comparison with, say, tribes of warring chimpanzees. And when it comes to human culture, why do we lust after unlimited power and indulge in travesties like racism, sexism and specism? Put theologically, why do we sin? Why do we fail to love and serve God above all else and instead indulge ourselves in unbridled pride and inordinate sensuality?

One form of Christian response to this foundational question has been to assert with Reinhold Niebuhr the paradox that sin is not an intrinsic part of human nature and yet it is an inevitable component of human behavior. Indeed its only remedy is the grace of God freely given us.[44] Making it intrinsic would rob us of our individual and corporate responsibility on which our legal and political systems are built; failing to recognize its inevitability would lead to the false hope that we can free

ourselves through one of countless 'self-help' movements without depending radically on the grace of God. In sum, each of us inherits both the *imago dei*, the 'image of God', and the inevitability of sin, and both are unique to our species. [45]

This traditional response conforms nicely to our contemporary scientific understanding of biological evolution, particularly with the philosophical theme of 'novelty within continuity. Thus we as a species inherit diverse propensities from our pre-hominid past, but in *homo sapiens* something strikingly new emerges. This 'newness' is manifest both in the *imago dei*, including our capacity for relationship, abstract thought, formal language, complex technologies, art, ethics and science, and in the reality of human sin, including ruthless violence and our insatiable appetites for power and control. It is only through the grace of a loving God that our lives can be transformed into the fullness of what it truly means to be human. Conversely, the formation of authentic human personhood requires a lifetime of genuine wrestling with tough moral choices and the repentance of moral failure.

What then about ETI and the 'domain' of moral failure: is it truly universal or is it limited to terrestrial history? I have suggested for scientific, philosophical and theological reasons that the essential characteristics of human life are a genuine clue to the nature of life in the universe and not just an evolutionary fluke of the evolutionary processes on Earth. I therefore expect that ETI will experience a kind of moral dilemma that in many ways resembles the moral quagmire of human experience, though obviously differing in its 'moral morphology' --- the personal and social form of ethics. Jill Tarter has argued that extraterrestrial civilizations will be far older than ours, and to achieve such longevity, they will have had to overcome the temptation to warfare.[46] I tend to agree with her observation, but it still leaves open the question of how such temptation is overcome?

My assumption is that ETI will experience an empowering for their struggle by a source which transcends ETI's natural capacities. Put into theological language, I believe --- perhaps I should say I predict! --- that God will be present to the struggles of life everywhere, and that God's grace will redeem and sanctify every species in which reason and moral conscience are kindled.

Will ET need redemption?

As a Christian theologian and scientist, this leads me to a final question: should Christians expect that a single Incarnation of Christ in the person of Jesus is sufficient for the redemption of all life in the universe, or should we expect there to be an Incarnation of Christ in each species of ETI that is gifted by reason and challenged by moral ambiguity? An adequate discussion would take us far beyond the limits of this essay, but I do want to note in closing that modest support for both options can be found among Protestants and Roman Catholics: a single, universally efficacious Incarnation is suggested by Protestants Ted Peters and Wolfhart Pannenberg and Roman Catholics L. C. McHugh and J. Edgar Bruns, while multiple Incarnations have been considered by Protestants, such as Paul Tillich and Lewis Ford and by Roman Catholics, including Karl Rahner, E. L. Mascall and Ernan McMullin.[47] All agree, however, that wherever ETI exists, it will be the creation of a loving and redeeming God.

Four philosophical and theological presuppositions *underlying* the scientific search for intelligent life in the universe

In the first part of this paper I looked at the scientific search for extraterrestrial intelligent life in the universe and developed a number of philosophical and theological implications based on that research. This method of reflecting theologically on a philosophical interpretation of the results of science represents the standard way theologians incorporate scientific theories and their philosophical implications into theology, an approach which Ian G. Barbour calls a "theology of nature."[48]

Now I would like to do something rather unusual: reverse the direction of inquiry and ask whether there are philosophical presuppositions lying within the scientific search for extraterrestrial intelligent life, presuppositions which actually shape its research strategies? And are there, in addition, theological presuppositions underlying the philosophical ones which also play a role, however

dimunitive, in influencing this scientific research?

I am certainly not suggesting that ETI researchers *per se* are necessarily aware of either of these sets of presuppositions or that, if they were, they would agree with them. In fact I would expect strong disagreement by some of them, especially with the theological presuppositions I will discuss below. But I am suggesting that the philosophical presuppositions, and possibly the theological ones as well, are effectively present in some way, even if only implicitly, within ETI research and that they tend to play a role in shaping this research whether or not they are explicitly acknowledged --- or even repudiated. I would even suggest that it is hard to understand how such research could get launched in the first place without something like these philosophical presuppositions and, perhaps, their underlying theological ones.

Philosophical presuppositions underlying ETI research.

First I will identify four philosophical presuppositions which I believe underlie, even if only implicitly, the scientific search for intelligent life in the universe. Again I take these to be presuppositions without which it is hard to see how ETI research as we know it could proceed --- even if few if any of the scientists participating in this research explicitly acknowledges them and even if, upon reading this essay, they would reject them. In the second part below I will explore their underlying theological presuppositions.

The four philosophical presuppositions are:

1) ETI exists in relative abundance.
2) ETI can be recognized by their signal.
3) ETI wants to be discovered.
4) ETI is more likely benign than malevolent.

Let's look at these philosophical presuppositions in some detail before moving on to their possible theological underpinnings.

1) ETI exists in relative abundance. I call the first philosophical assumption the "ontological assumption." It goes like this: The laws of

nature, as found in physics and biology, are uniform and universal. Since they produced intelligent life on earth, they will lead to intelligent life throughout the universe.

This is a very natural assumption for scientists to make, and for several reasons. First, how else can we allow data to falsify our theories if we don't presuppose that these theories hold everywhere? Second, why make things more complicated than they need be? Here is a quote from an interview by Michael Meyer posted on July 15th, 2012, on *Astrobiology Newsline* online.[49] First we hear from David Grinspoon, Principal Scientist in the Department of Space Studies, Southwest Research Institute in Boulder, Colorado:

> David Grinspoon: It is always shaky when we generalize from experiments with a sample size of one. So we have to be a bit cautious when we fill the cosmos with creatures based on the time scales of Earth history (it happened so fast here, therefore it must be easy) and the resourcefulness of Earth life (they are everywhere where there is water). This is one history, and one example of life. When our arguments rest on such shaky grounds, balancing a house of cards on a one-card foundation, we are in danger of erecting structures formed more by our desires than the "evidence."

Then we hear from legendary Frank Drake, Professor of Astronomy and Astrophysics at the University of California at Santa Cruz and Chairman of the Board of Trustees of the SETI Institute:

> I think this is an occasion where that old principal of good science, Occam's Razor, is helpful. Apply Occam's Razor to the question of the origin of life on Earth. We look at the Earth, and with regards to that origin, as best we know, no special or freak circumstances were required. It took water, organics, a source of energy, and a long time. Deep-sea vents are the current favorite and a reasonable place for the origin. But even if they weren't the culprits, the chemists have found a multitude of other pathways that produce the chemistry of life. The challenge seems to be not to find THE pathway, but the one that was the quickest and most productive. The prime point is that nothing special was required. There will be a pathway that works, on Earth and on similar planets. *Then, by Occam's Razor, the origin of life on Earth is nothing more than the result of normal processes on the planet. Furthermore, life should appear very frequently on other Earth-like planets.* (Italics added.)

So the point here is that scientists like Drake routinely appeal to Occam's Razor because it feels natural to the way they do science and chose between competing ideas. My point is not to dispute their use of Occam's Razor; it seems to work very well in a whole range of the

natural sciences. My point is simply to point out that Occam's Razor is not a scientific theory like quantum mechanics or general relativity. Instead it is a philosophical claim, one concerned about how to chose between competing scientific theories using criteria that transcend both the empirical date on which these competing theories are based and the theoretical explanations of these data which are in dispute. It is a vivid example of philosophy playing an active if intrinsic role in research science.

2) ETI can be recognized by us by their signal. I call the second philosophical assumption the "universal rationality assumption." It is the philosophical assumption that various forms of rationality that have evolved by distinct ETIs in the universe have more in common than they do in their diversity. The contrary assumption is that ETIs on radically planetary systems will reason in radically different, even incommensurate, ways. The common assumption among scientists is that if distinct and diverse ETIs are able to discover enough about nature that they can produce scientific theories, and their technological products, these theories and products will be in essence the same as ours. Not 'morphologtically', anymore than the proposal that ETI will 'look' like us, a proposal no one but Hollywood occasionally purports, but 'in principle,' one in which the theories and discoveries of ETI will be deeply analogous to those of humankind.

3) ETI wants to be discovered. The third philosophical assumption is that relationality, the thirst to overcome life's isolation, is something to be sought overwhelmingly. It starts with the elementary assumption that intrinsic relationality is of far more importance to human life than radical individuality. It then extends this to life wherever it is in the universe. Why else would we assume that life beyond our solar system has any interest in reaching out to other, potentially very different, forms of life such as us? Instead the assumption in ETI research is that living creatures throughout the universe have a deep hunger to reach out and discover their very distant "cousins" in the immense swaths of inter-stellar space.

4) ETI is more likely to be benign than malevolent. Here we

come to the fourth philosophical assumption: love between families, communities, and evolutionary ancestors is stronger than hate. Scientific evidence can be appropriated from studies in altruism in pre- and non-human species. But at bottom this is a philosophical assumption which is required if one is to pursue SETI research. Hollywood gives us two stark alternatives which, while grossly overdrawn, serve to put the assumption into stark relief[50]: the 1982 movie *ET: The Extraterrestrial*[51] and the 1996 movie *Independence Day*.[52] In the former, an angelic alien seeks a peaceful encounter with humans even while longing to journey home. In the latter, a monstrous alien race invades earth to commandeer its natural resources with no consideration for its inhabitants. Which portrayal is more likely?

Clearly, short of an actual encounter, all we can do is speculate philosophically. But that is exactly my point. I believe the implicit assumption made by the ETI research community is by and large that ETI will be benign, even angelic. While I tend to agree with this assumption, I want to stress that it is a philosophical assumption, not a scientific fact, and it is one which tends to govern and even guide ETI research.

Theological assumptions underlying the philosophical assumptions governing ETI research

Previously I identified four philosophical presuppositions or assumptions which seem to underlie the search for intelligent life in the universe, assumptions without which it is hard to see how such research could proceed. Now I want to identify four theological assumptions which I believe underlie these philosophical ones and which in this way support, even if indirectly, the scientific research. As with the previous discussion of philosophical assumptions, I do not mean to suggest that some --- or perhaps any --- scientists involved with the search for intelligent life in the universe intentionally make these theological assumptions. Many, in fact, would most likely reject them --- some vigorously. I also admit that here I am going to identify theological assumptions which are distinctively Christian. It would be wonderful to see how scholars of other religions might unearth differing theological assumptions at work in the ETI research community. But I do feel that it is hard to see how research as we find it by scientists searching for intelligent life in the

universe could proceed without something like the following theological assumptions underpinning the philosophical presuppositions of their research.

It might be helpful to start by restating the four philosophical assumptions explored above before turning to what I take to be their theological underpinnings:

1) ETI exists in relative abundance.
2) ETI can be recognized by their signal.
3) ETI wants to be discovered.
4) ETI is more likely benign than malevolent.

1) ETI exists in relative abundance. This first philosophical assumption regards the uniformity and universality of the laws of nature. If we assume that the laws of nature, as found in physics and biology, are uniform and universal, and if they lead to the evolution of intelligent life on earth, they we can conclude (*pace* the discussions in the first part of this essay) that they will lead to the evolution of intelligent life throughout the universe. It is a further, but small, step to assume that such life will be in relative abundance. But why should the laws of nature be universal and uniform?

The theological presupposition which addresses this question is that God intentionally created the universe with the right "fine-tuned" laws and constants of nature so that life could evolve into creatures capable of self-conscious relationship with God. In addition these laws must hold, and be the same, everywhere.

I have discussed the ways the laws and constants of nature are "fine-tuned" for the evolution of life elsewhere.[53] But the assumptions that the laws of nature must hold, and be the same, everywhere are important theological assumptions to explore here. They can readily be found in the *logos* tradition borrowed from Greek philosophy and imported into Christianity as early as the end of the first century C.E. Here the *logos*, or the Word of God, is that through which all things were made (see for example John 1:3). The *logos* accounts for the rationality, and in turn the intelligibility, of nature as expressed through the laws of nature as found in physics and biology. The uniqueness of the divine *logos* leads to the uniformity of the laws of nature; since there is only one

divine *logos*, there is no principle by which the laws of nature which express its rationality could vary in any non-trivial ways. The ubiquity of its effects, the fact that all things were created through the unique divine *logos*, leads to the claim that nothing will be found in the universe that does not bear the mark of having been created in keeping with these same natural laws.

2) The second philosophical assumption is that life throughout the universe can recognize the signals sent by ETI civilizations. In essence, even if there is some degree of diversity in the forms of rationality that various species of ETIs possess, their rationalities have so much in common than they will all have discovered the underlying laws of nature even when these laws are expressed in different mathematical formulations.

The theological assumptions supporting this philosophical assumption have several parts. The first is the assumption that there will be a commonality among the forms of rationality of intelligent species in the universe. This assumption of commonality is a sign of the *logos* tradition inherent, though implicit, in secular / scientific culture. This tradition provides a theological warrant for the secular expectation of the commonality of all forms of creaturely rationality in the universe. The second is that all intelligent species, if they are indeed created in the *imago dei*, will discover the same laws of nature because the *imago dei* is the presence of the universal divine *logos* in human nature, and by extension, in ETIs who will also bear the divine image. Finally the third is the assumption that all ETI, created in the *imago dei*, will use these laws to build instruments capable of signaling that they are alive in the universe.

3) ETI wants to be discovered. The third philosophical assumption is that relationality, the thirst to overcome life's isolation, is something to be sought after as one of life's highest values. In our context this assumption may seem obvious: why wouldn't ETI reach out to whoever might be listening? But I believe there is an underlying theological assumption active here which funds the philosophical assumption of ETI's all-consuming quest for contact. This might be the most controversial theological assumption I will point to, and again, if it exists it is implicit, even unnoticed, by the community of scientists searching for ETI. Still I believe it is present in much of Western culture and I

view it as seeping into the scientific community in subtle ways. This theological assumption is that all life in the universe has been created by the God who is Trinity, a God who is intrinsicly relational. (For an excellent discussion of relationality in the divine Trinity see Ted Peters' *God as Trinity*[54].) If this is so, then God's creatures, in turn, reflect this intrinsic relationality. If this in turn is so, then it is no wonder that ETI wants to make its presence known to other intelligent life in the universe.

4) ETI is more likely to be benign than malevolent. The final philosophical issue is that love is stronger than hate. Here I want to suggest that a theological grounding for this philosophical assumption is provided by the belief that God, the Creator of all life in the universe, is love (1 John 4.8), that God creates all things through love, and that love ultimately overcomes hatred, sin and evil. Of course this is a huge assumption which must take on board the enormous problem of human evil over the past millennia, and natural evil (as it were) over millions, even billions, of years[55]. Nevertheless, my expectation is that while ETI might appear, and at first even act, in ways reminiscent of the movie *Independence Day*, ultimately that will not be the whole story of humanity's encounter with ETI. If I am right theologically, that story will be much more the story of the movie *ET: The Extraterrestrial*. [56]

Literature and notes

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3.See Ted Peters, "Exo-Theology: Speculations on Extra-Terrestrial Life," *CTNS Bulletin* 14.3(Summer 1994) (Berkeley: Center for Theology and the Natural Sciences). For a recent survey of Roman Catholic views, see Douglas A. Vakoch, "Roman Catholic Views of Extraterrestrial Intelligence: Anticipating the Future by Examining the Past," in *When SETI Succeeds: The Impact of High-Information Contact*, ed. Allen Tough (Bellevue, Washington: Foundation for the Future, 2000). See also Ernan McMullin, "Life and Intelligence Far from Earth: Formulating Theological Issues," in *Many Worlds: The New Universe, Extraterrestrial Life & the Theological Implications*, ed. Steven Dick (Philadelphia: Templeton Foundation Press, 2000); Coyne, S. J., George V., "The Evolution of Intelligent Life on Earth and Possibly Elsewhere: Reflections from a Religious Tradition," in *Many Worlds* ed. Steven Dick. For a recent survey of ethical implications see Richard O. Randolph, Margaret S. Race and Christopher P. McKay, "Reconsidering the Theological and Ethical Implications of Extraterrestrial Life," *CTNS Bulletin* 17.3(Summer 1997) (Berkeley: CTNS). Then see of course Ted Peters' essay in this publication.

4. Steven J. Dick, *Plurality of Worlds* (Cambridge: Cambridge University Press, 1982), esp. Ch. 2.

5.In my opinion the discovery of EL/ETI would not undermine the central claims of 'established religion', particularly Christianity, as many authors assume, although it would challenge a literal and inerrant reading of scripture in *any* religion. For Christians who take scripture as normative but not as literal and inerrant, there is plenty of room for a creative interaction between faith and science, including the discovery of EL/ETI.

[6] CMI reference.

7.See for example Freeman Dyson, *Disturbing the Universe* (New York: Harper and Row, 1979), Ch. 19; Steven J. Dick, "Extraterrestrials and Objective Knowledge," in *When SETI Succeeds* ed. Allen Tough.

[8] Ref.

[9] http://www.nasa.gov/mission_pages/msl/index.html

[10] http://www.seti.org/

11. Stephen Jay Gould, *The Flamingo's Smile: Reflections in Natural History* (New York: W. W. Norton, 1985).

[12]For a delightful account in the author's own words, see http://www.closertotruth.com/video-profile/Why-aren-t-Aliens-Already-Here-Francisco-J-Ayala-1-of-2-/188

13. Paul Davies, "Teleology Without Teleology: Purpose Through Emergent Complexity," in *Evolutionary and Molecular Biology: Scientific Perspectives on Divine Action*, ed. Robert John Russell, William R. Stoeger and Francisco J. Ayala

(Vatican City State; Berkeley, Calif.: Vatican Observatory Publications; CTNS, 1998).
14. Christian De Duve, *Vital Dust: Life as a Cosmic Imperative* (New York: Basic Books, 1995).
15. Julian Chela-Flores, "The Phenomenon of the Eukaryotic Cell," in *Evolutionary and Molecular Biology* ed. Robert John Russell, et. al. Also see his paper in GET REFERENCE
16. Bertrand Russell, "A Free Man's Worship," in *Mysticism and Logic* (London: Allen & Unwin, 1903).
17. Jacques Monod, *Chance and Necessity*, trans. Austryn Wainhouse (New York: Vintage Books, 1972).
18. Steven Weinberg, *The First Three Minutes* (New York: Basic Books, Inc., 1977), 154.
19. Paul Davies, "Is the Universe Absurd?" in *Science and Theology* ed. Ted Peters, esp. 72-76; Davies, *The Cosmic Blueprint* (New York: Touchstone, 1989); Davies, "Teleology Without Teleology", in *Evolutionary and Molecular Biology*, ed. by Robert John Russell et. al. (REF)
20. William R. Stoeger, "The Immanent Directionality of the Evolutionary Process, and Its Relationship to Theology," in *Evolutionary and Molecular Biology* ed. by Robert John Russell et. al..
21.Freeman Dyson, *Disturbing the Universe*, 250. Dyson, *Infinite in All Directions* (New York: Harper and Row, 1988), 117-18.
[22] Richard Dawkings, *The Blind Watchmaker: Why the Evidence of Evolution Reveals a Universe without Design* (Penguin Books, 2006).
23. Francisco J. Ayala, "Introduction," in *Studies in the Philosophy of Biology: Reduction and Related Problems*, ed. Francisco J. Ayala and Theodosius Dobzhansky (Berkeley: University of California Press, 1974); Francisco J. Ayala, "Reduction in Biology: A Recent Challenge," in *Evolution at a Crossroads*, ed. David J. Depew and Bruce H. Weber (Cambridge: MIT Press, 1985), 67-78; Francisco J. Ayala, "Can 'Progress' Be Defined as a Biological Concept?" in *Evolutionary Progress*, ed. Matthew H. Nitecki (Chicago: University of Chicago Press, 1988), 75-96.
24. Ernst Mayr, "How Biology Differs from the Physical Sciences," in *Evolution at a Crossroads* ed. by David J. Depew and Bruce H. Weber, 67-78.
25. Charles Birch, *A Purpose for Everything* (Mystic, Connecticut: Twenty-Third Publications, 1990); Charles Birch, *Feelings* (Sydney: University of New South Wales Press, 1995); Charles Birch, "Neo-Darwinism, Self-Organization, and Divine Action in Evolution," in *Evolutionary and Molecular Biology* ed. by Robert John Russell et. al..
[26] For an excellent introduction and overview see *Evolution from Creation to New Creation: Conflict, Conversation and Convergence*, Martinez J. Hewlett and Ted Peters, eds. (Abingdon Press, 2003).

27.Arguments from "t=0" in Big Bang cosmology are often used to support this view, even though the theological claim is primarily about existence *per se* and not temporal origins. For recent references, see Robert John Russell, "Finite Creation Without a Beginning," in *Quantum Cosmology and the Laws of Nature: Scientific Perspectives on Divine Action*, ed. Robert J. Russell, Nancey C. Murphy and Chris J. Isham (Vatican City State; Berkeley, Calif.: Vatican Observatory Publications; Center for Theology and the Natural Sciences, 1993).
28.Note: I am assuming a non-interventionist view of God's immanent action here, one consistent with science. For details, see the CTNS/Vatican Observatory conference publications referenced in these Notes.
29.Scarcity can indicate value: The discovery of a single palm tree in a vast desert does not mean that the tree is insignificant. Instead its scarcity makes it a tremendous discovery, for a hidden spring of life-giving water lies at its roots. I feel this way about Earth whether or not life is found elsewhere in the universe. Our planet is like the palm tree in what might in fact be a vast interstellar desert. If it takes a thousand million stars to produce the conditions for the possibility of a sea urchin, if it takes a billion years of tinkering with genetic dice to produce a hummingbird, and if it takes a million years of scratching on bark and vocalizing intentions to produce a child who can reach out through human artifacts and chalkboard calculations and touch the edge of the visible universe, then life per se is surely "the pearl of great price" (Matt. 13:45-46) and a clue to the theological meaning of the universe as a whole.
30.This is *not* an attempt to derive ethics from biology, the so-called 'naturalistic fallacy.'
31.See for example Michael Ruse, *Sociobiology: Sense or Nonsense?* (Dordrecht: Reidel, 1979); Michael Ruse, *Darwinism Defended* (Reading: Addison-Wesley, 1982); Michael Ruse, *Taking Darwin Seriously* (Oxford: Blackwell, 1985); Michael Ruse, "Evolutionary Theory and Christian Ethics: Are They in Harmony?" *Zygon* 29.1(March 1994).
32. Michael Ruse, "Evolutionary Ethics," in *Biology, Ethics and the Origins of Life*, ed. Holmes Rolston III (Boston: Jones and Bartlett Publishers, 1995), 95, 100. As Rolston summarizes Ruse: "Ethics is not true, though it is functional. (But) ethics cannot be functional unless it is believed to be true in an objective sense, a false belief." Holmes Rolston, ed., *Biology,* 8. Rolston is sharply critical of Ruse in *Genes, Genesis and God* (Cambridge: CUP, 1999).
33.See for example Ayala, "Introduction"; Ayala, "Reduction in Biology"; Ayala, "Can 'Progress' Be Defined?"
34. Francisco J. Ayala, "Ethical Behavior as an Evolutionary Byproduct," in *Biology*, ed. Holmes Rolston III, 118.
35. Arthur Peacocke, "Reductionism," *Zygon* 11.4(December 1976); Peacocke, *Creation and the World of Science* (Oxford: Clarendon Press, 1979); Peacocke, *God and the New Biology* (San Francisco: Harper & Row, 1986); Peacocke, *Theology for a Scientific Age*.

36. Ian G. Barbour, *Issues in Science and Religion* (New York: Harper & Row, 1971); Ian G. Barbour, "Ways of Relating Science and Theology," in *Physics, Philosophy, and Theology* ed. by Robert J. Russell et. al., 21-48; Barbour, *Religion in an age of science*; Ian G. Barbour, "Five Models of God and Evolution," in *Evolutionary and Molecular Biology* ed. by Robert John Russell et. al...
37. Murphy, "Theology in the Age of Scientific Reasoning."; Nancey Murphy, *Beyond Liberalism and Fundamentalism* (Valley Forge, Pa.: Trinity Press International, 1996); Nancey Murphy, "Supervenience and the Nonreducibility of Ethics to Biology," in *Evolutionary and Molecular Biology* ed. by Robert John Russell et. al.; Nancey Murphy, "Nonreductive Physicalism: Philosophical Issues," in *Whatever Happened to the Soul?* ed. Warren S. Brown, Nancey Murphy and and H. Newton Malony (Minneapolis: Fortress Press, 1998); Nancey Murphy, "Supervenience and the Downward Efficacy of the Mental: A Nonreductive Physicalist Account of Human Action," in *Neuroscience and the Person: Scientific Perspectives on Divine Action*, ed. by Robert John Russell et. al. (Vatican City State; Berkeley, California: Vatican Observatory Publications; Center for Theology and the Natural Sciences, 1999).
38. George F. Ellis, *Before the Beginning: Cosmology Explained* (New York: Boyars/Bowerdean, 1993); George F. Ellis, "The Theology of the Anthropic Principle," in *Quantum Cosmology and the Laws of Nature* ed. by Robert J. Russell, et. al., 367-406; George F. Ellis, "Ordinary and Extraordinary Divine Action: The Nexus of Interaction," in *Chaos and Complexity: Scientific Perspectives on Divine Action*, ed. Robert J. Russell, Nancey C. Murphy and Arthur R. Peacocke, Scientific Perspectives on Divine Action Series (Vatican City State; Berkeley, Calif.: Vatican Observatory Publications; Center for Theology and the Natural Sciences, 1995), 359-96; Nancey Murphy and George F. Ellis, *On the Moral Nature of the Universe: Theology, Cosmology, and Ethics*, (Minneapolis, Minn.: Fortress Press, 1996); George F. R. Ellis, "The Thinking Underlying the New 'Scientific' World-Views," in *Evolutionary and Molecular Biology* ed. by Robert John Russell et. al.; George Ellis, "Reflections on Quantum Theory and the Macroscopic World," in *Quantum Physics: Scientific Perspectives on Divine Action*, ed. Robert John Russell, Philip Clayton, et al. (2001).
39. Paul C. Davies, *God and the New Physics* (New York: Simon & Schuster, 1983), 71.; Paul Davies, "Transformations in Spirituality and Religion," in *When SETI Succeeds* ed. by Allen Tough.
40.Peters, "Exo-Theology: Speculations on Extra-Terrestrial Life," 1. I agree with Peters (see Note #3 above). As Peters points out (p. 2; 7), it may have been the Protestant Fundamentalist reaction to UFOs in the 1970s that gave rise to the view of Christianity that Davies critiques. See also McMullin, "Life and Intelligence Far from Earth," 164-67.
41.As Peters shows, Greek atomists such as Democritus and Epicurus argued for many worlds, but Aristotle rejected their views. Thomas Aquinas sought to reconcile

Aristotle with Christian tradition, defending a "one world" view for philosophical reasons. Others, such as John Buridan, Nicole Oresme, Albertus Magnus, the Jewish scholar Hasdai Crescas, and Nicholas of Cusa, favored the "many worlds" position. See Dick, *Plurality of Worlds*.

42. Peters, "Exo-Theology: Speculations on Extra-Terrestrial Life," 4-5.

[43] See Peters' chapter in this volume.

44. Reinhold Niebuhr, *The Nature and Destiny of Man: I* (New York: Charles Scribner's Sons, 1941 (1964)), VI - X.

45.It is interesting to compare the Augustinian view with contemporary cultural positions. For example, consider our two questions about sin: 1) is it in our nature? 2) is it avoidably by human effort alone? The Augustinian response is: 1), no; 2), no. A secular humanist would probably answer: 1), no; 2), yes. Interestingly, Carl Sagan seemed to take the position: 1), yes (the tripartite brain and its conflicts); 2), yes (through science).

46.Tarter claims that ET's longevity is inconsistent with them having "organized monotheistic religions" since they are the cause of warfare on earth. Clearly sustained warfare is inconsistent with cultural longevity, but her suggestion of a causal relation between monotheism and warfare would be hard to defend critically. Of course religion is often used as an excuse for violence, but the real question is why humans are capable of such violence. It also seems odd that she speculates favorably about a "universal religion" having a "highly established code of ethics" centered on "the perpetuation of individuals" when these tenets are found in the monotheisms which she rejects. (Jill Tarter, "Implications of Contact with ETI Far Older Than Humankind," in *When SETI Succeeds* ed. by Allen Touch.)

47.For references, see Peters, "Exo-Theology: Speculations on Extra-Terrestrial Life," 5-6. See also Eric L. Mascall, *Christian Theology and Natural Science* (New York: Longmans, Green & Co., 1956), 36-45; McMullin, "Life and Intelligence," 171-73. Coyne, in "The Evolution of Intelligent Life," leaves the question open. In order to pursue this systematically, one would need to consider a variety of theological issues. Though I agree with Davies that the discovery of EL/ETI will bring a profound transformation in "spirituality and religion", Christological suggestions in the literature do not seem to have what Davies caricatures as "an air of absurd theatricality" or constitute a Catholic "heresy". (See Davies, "Transformations") McMullin views the arguments by Davies seem "simplistic" (p. 172).

[48] REF

[49] http://www.astrobio.net/debate/236/complex-life-elsewhere-in-the-universe

[50] I am using movies from Hollywood mostly to illustrate my point and not to suggest that these movies capture the assumptions at work in the scientific community in a literal way, of course.

[51] http://www.greatdreams.com/ufos/etmovie.htm

[52] http://www.imdb.com/title/tt0116629/

[53] *Cosmology from Alpha to Omega: The Creative Mutual Interaction between Theology and Science* (Fortress Press, 2008).
[54] Ted Peters, *God as Trinity: Relationality and Temporality in the Divine Life*, (Louisville, Ky.: Westminster/John Knox Press, 1993).
[55] See "Physics, Cosmology and the Challenge to a Consequentialist Natural Theodicy," in *Physics and Cosmology: Scientific Perspectives on the Problem of Natural Evil*, eds. Nancey Murphy, Robert John Russell and William R. Stoeger S. J. (Vatican City State: Vatican Observatory Publications, and Berkeley: Center for Theology and the Natural Sciences,2007).
[56] Now some scientists have expressed strong reservations about the search for ETI for precisely the fear that they will want to conquer us. Nevertheless I believe that the predominant assumption is scientists searching for evidence of intelligent life in the universe have something like *ET* in mind. And clearly it is an expectation that Christians can, and should, readily embrace.

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